electrical contracting

With which is consolidated The Electragist and Electrical Record
Established 1901

Contents

JANUARY, 1938

Departments

A SERVICE PAPER for electrical contractors, engineers, motor shops, industrial electricians and inspectors, covering engineering, installation, repairing, maintenance and management, in the field of electrical construction — industrial, commercial, residential

McGRAW-HILL PUBLISHING COMPANY, INC.
Publication Office, 99-129 North Broadway, Albany, N. Y.
Editorial and Executive Offices, 330 W. 42nd St., New York, N. Y.

JAMES H. McGRAW, JR. President
HOWARD EHRLICH Executive Vice-President
JAMES H. McGRAW Honorary Chairman
B. R. PUTNAM Treasurer
D. C. McGRAW Secretary
A. W. MORRISON Circulation Manager

Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta. Published monthly, price 25 cents a copy. Vol. 37, No. 1. Subscription rates: U. S. and Canada, $2 a year; all other countries, $2.50 a year. Entered as second-class matter August 29, 1936, at Post-office at Albany, N. Y., under the Act of March 3, 1879. Printed in U. S. Cable address: "McGrawhill, New York." Member A.B.P. Member A.B.C.

electrical contracting

JANUARY, 1938

Dust Off Your Scalps

WAMPUM IS GREAT STUFF. The Indians were crazy about it. We make it out of silver and call it money. But it's still great. And we spend most of our working hours in search of it. Those who aren't awake, keep dreaming of it.

THERE WAS ANOTHER FINE OLD INDIAN CUSTOM. On New Year's Day each brave would dust off his stack of scalps, discard the moth eaten ones and figure out how many more he needed to dress the wigwam and trim up his dancing pants. Then he'd put on the war paint and raise a whoop. And the good Indians brought some back.

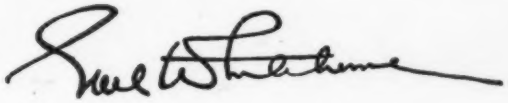
IT IS JUST THE SAME WITH US TODAY. Only we have a different system. On January first we always say "This year I'm gonna knock 'em on the nose!" And then we let our entire minds bog down in the puny details of being busy. We lead no war parties. We get no scalps.

BUT THERE IS JUST ONE THING can keep a contractor or a motor shop man from prosperity and success this year. And it isn't general conditions. And it isn't lack of capital. It is lack of thinking, planning, doing—*beyond the day's work!* Old Big Chief Bacon-in-the-Pan was just the Indian with imagination, who could see beyond his campfire and think with his enemies. He got ahead.

WHERE MOST MEN NOW GO WHACKY, of course, is that they believe orders come only from customers. That's just half right. For it takes two men to create an order—a customer and a salesman. And it is only when these two work well together that business is good.

AND THERE WE HAVE IDEA NO. 1 FOR 1938! It sounds too easy—but this idea is strong and everlasting. It says—*Get your mind out of your shop. Think with your customers.* In a word, make it your job to plan for them—how this factory, this store, this office account can take the next step in its use of electricity. Then show them why and do the job. And the same in homes.

ACTUALLY THIS ONE IDEA IS ALL YOU NEED to make this a Good Year. For success is as simple as that. So dust off your scalps! Daub on the paint! Take the war path!



What's Ahead in BUSINESS?

H. ARMSTRONG ROBERTS and EWING GALLOWAY

A Plain Statement of Facts

EVERY electrical contractor and motor shop man in the country today is asking himself this question. He is wondering what's ahead in business and how it will affect his own affairs in his own town.

So we go around asking this one and that and usually we get confusion for our pains. Each man we ask gives us but a fragment of his opinion. Few can offer more than a mere collection of vague impressions anyway. And so the more we ask—the more we wonder.

No man knows exactly what lies ahead in the present business outlook. He may be a prophet or the son of a prophet—but the fabric of the economic and social structure that supports business today is too complex. We still don't understand it. We may have hindsight enough to look back and analyze what has happened. But we lack the foresight to pierce the veil of political and market conditions that obscure the years ahead.

It is by no means hopeless, however. There are plenty of facts to turn over in your mind. Out of them anyone can get a clearer picture of what is happening. In them any one can anchor his opinion and work out his own judgment, of what he should expect and what he should do. And this takes the uncertainty and fear out of the problem. Here are some of these facts in orderly array to use in your own thinking—

1 *The Business Situation*

The present recession in business is something very different from the depression that overwhelmed us in the fall of 1929. That was the beginning of a major downfall in the business cycle. This is a period of intermediate readjustment. Look back over the curve

of the past hundred years and you see a lot of them.

In 1929 banks were short of cash and long on loans. Business had finished a seven year period of almost uninterrupted industrial expansion. Every kind of business was not only buying for current requirements but stocking up for future needs for protection against rising prices.

Today banks are long on cash and short on loans. Business is only just starting up after six years of *under* maintenance, *under* replacement and *under* expansion. Inventories are way down and everybody is buying from hand to mouth.

The whole situation is different. In 1929 all these factors spelled trouble and risk. Today they spell security and hope.

2 *The Political Situation*

The present uncertainty, therefore, lies not in the economic realm but in political conditions. The quickening flow of business volume has stopped because government policies are drastically interfering with the ability of business to make a profit.

The undistributed earnings tax, the capital gains tax, the real and threatened competition with business by the Federal Government, the activities of the National Labor Relations Board in labor disputes and the prospect of a restrictive Wages and Hours bill, all have frightened business and capital. People do not dare invest their money in commercial enterprise. New securities to finance growth in business cannot be sold. Industry is choked.

But fortunately prospects are now bright for important revisions in our tax system. Administration and legislation leaders are showing a greater understanding of business needs. Congress seems less disposed toward government competition with business. It will probably repeal or at least modify this paralyzing taxation and restrain further impracticable reform adventures that demoralize business.

If so, investors will risk their savings again. Then employment will increase. And the staggering burden of relief, that the country is now carrying, will be reduced.

3 *The Status of Construction*

Building construction has fallen off, due in part to an abrupt rise in labor and material costs, but principally to uncertainty over the business outlook. However, the volume of private work caught up with public work last year and the total increased to nearly 60 per cent of normal.

Factory construction led the movement, all branches of manufacturing needing modernization and expansion. There was a promising start on the building of new stores, hotels and business buildings. Some 250,000 residences were put up and probably 100,000 more would have been built had the scare not come.

There is now a shortage of 2,000,000 dwellings. If the work starts up again where it sagged off last July, it is possible that there may be $1,500,000,000 spent for housing this year.

There is an enormous volume of other building construction work waiting for the courage to go ahead. Industry's need for more factory space can not wait long. Power company construction has lagged until $450,000,000 will be spent this year. Commercial buildings are not so easy to predict but 1937 totaled $470,000,000, a big jump from the $275,000,000 of 1936. A great volume of work in this field also waits on a return of confidence.

Base Your Expectation On These Factors

1. **Conditions today are very different from those of 1929. This is not another depression.**
2. **Present fears are largely political—subject to direct correction—and relief seems to be assured.**
3. **Electrical business moves with building construction and building is dammed up waiting to go ahead and can't wait long.**
4. **Most of the factories, stores, offices and homes in America are now badly under-wired and in urgent need of modernizing.**
5. **It is a combination that spells good business for electrical men. And those who do not wait will start getting it now.**

4 *The Electrical Opportunity*

To the electrical man all this means business on a scale that staggers the imagination. Every factory, every public and commercial building, every residence or apartment house will call for wiring. And that is only the beginning.

Beyond that wait say 100,000 factories, 500,000 stores, offices, hotels, theaters, and a large part of 22,000,000 homes, where the electrical wiring is inadequate and obsolete. And public opinion is rapidly rising in a demand for electrical facilities that will give them full brilliance from their lamps, full heat in their cooking devices and full speed in their motored appliances.

And the urgent need of the power companies to break this present obstacle to the sale of domestic equipment, and the continuing demand for current consuming appliances of all kinds, means that this market will not, cannot wait. Need spurs it on.

Restored confidence will open flood gates of new wiring business that threatens to overwhelm us. Just so, the coming of rapid industrial modernization promises to swamp the makers and installers of factory electrical equipment.

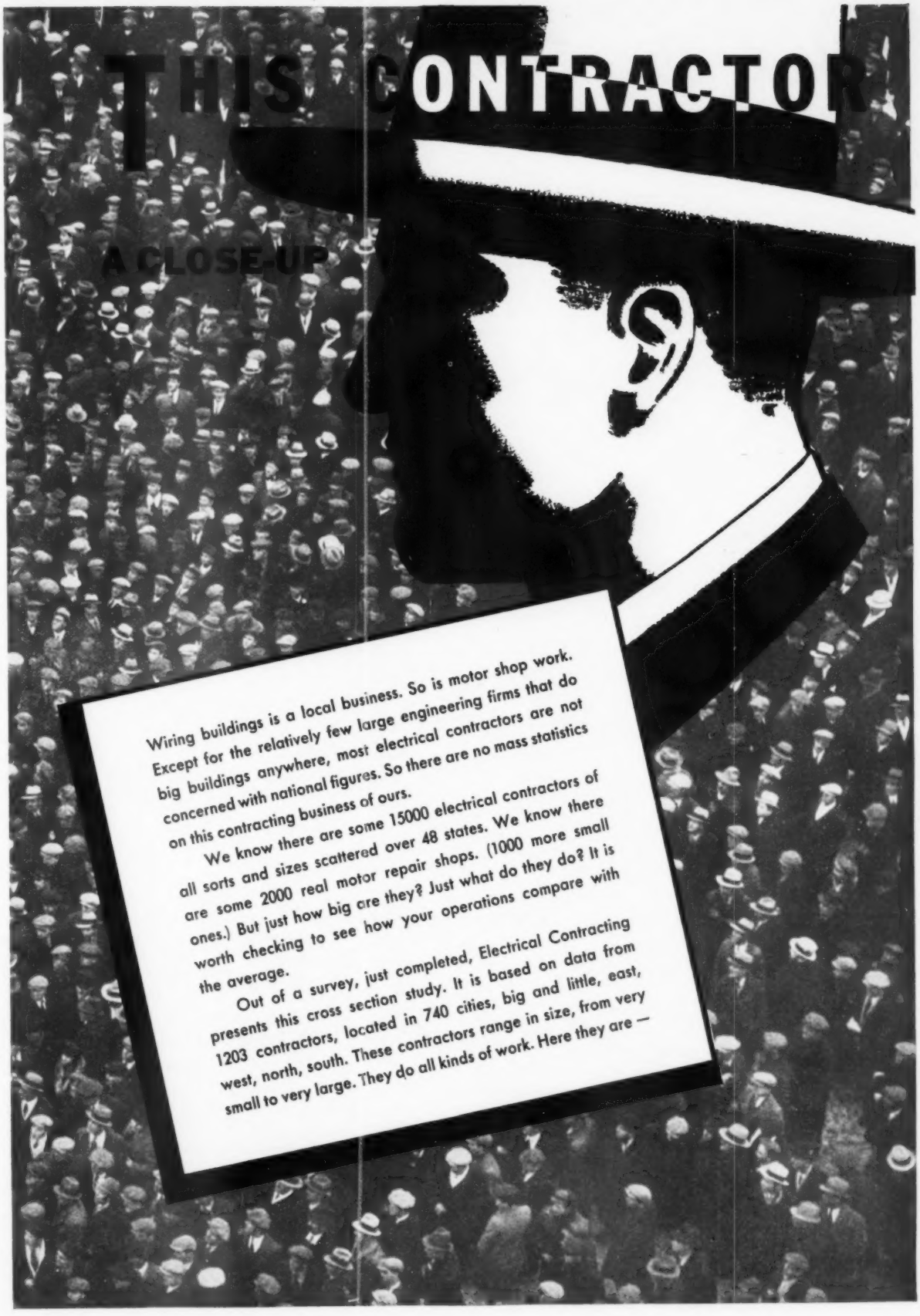
5 *What to Expect and What to Do*

There can be no turning back in face of such conditions. Inventories, throughout the country are exhausted. Buying must start. That means business for electrical manufacturers, wholesalers, contractors and dealers. Most industries are already shipping more than they are producing. Steel operations appear to be at the bottom. Wage rates are holding firm. Farm income is good, despite price declines. Purchasing power continues strong. Many basic raw materials have dropped so low in price that a turn about by spring is probable.

In a word, business should improve substantially through the spring. And beginning next fall—well ahead of elections—it should swing up with a sound and durable recovery, based upon actual consumption of goods.

We have had many temporary business recessions in the past 75 years in this country. Business has worked out of them each time, as certain mechanical readjustments have been made. This time the readjustments can be provided by Congress. There is good reason to believe some of them will come quickly.

It would seem, therefore, that this is the time to go forward with vigorous selling, without fear. Start the work where there is the most pressing need. The rest will follow.



THIS CONTRACTOR

A CLOSE-UP

Wiring buildings is a local business. So is motor shop work. Except for the relatively few large engineering firms that do big buildings anywhere, most electrical contractors are not concerned with national figures. So there are no mass statistics on this contracting business of ours.

We know there are some 15000 electrical contractors of all sorts and sizes scattered over 48 states. We know there are some 2000 real motor repair shops. (1000 more small ones.) But just how big are they? Just what do they do? It is worth checking to see how your operations compare with the average.

Out of a survey, just completed, Electrical Contracting presents this cross section study. It is based on data from 1203 contractors, located in 740 cities, big and little, east, west, north, south. These contractors range in size, from very small to very large. They do all kinds of work. Here they are —

What Do They Do?

These 1203 Contractors

68%

DO INDUSTRIAL WIRING

84%

DO COMMERCIAL WIRING

90%

DO RESIDENTIAL WIRING

53%

DO RURAL WIRING

Which Means That...

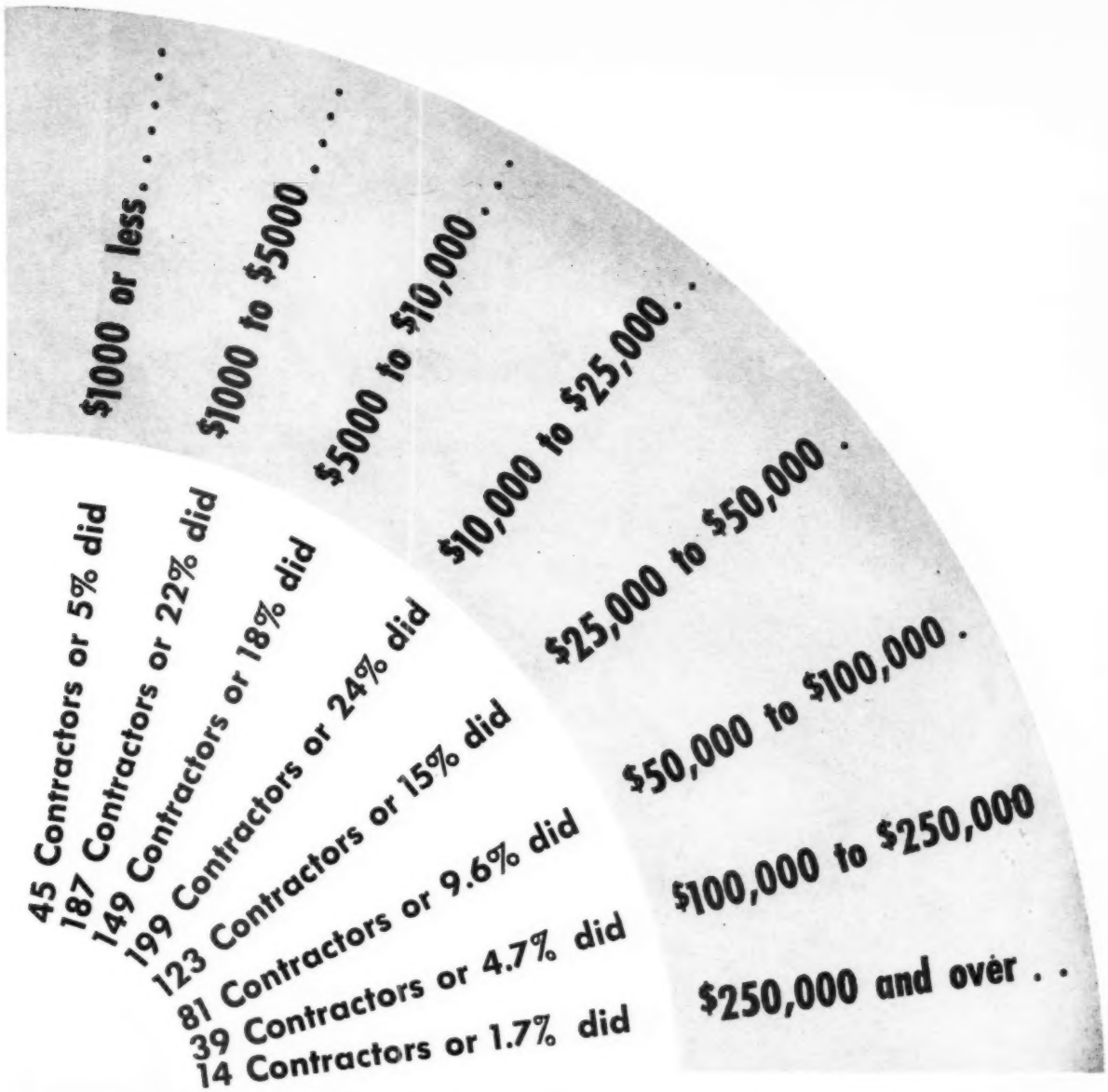
23 or 2% . . . . . DO INDUSTRIAL WORK ONLY

82 or 7% . . . . . DO ONLY INDUSTRIAL AND COMMERCIAL WORK

654 or 58% . . . COMBINE IND.—COMM.—RESIDENTIAL WORK

247 or 22% . . . . . DO ONLY COMMERCIAL—RESIDENTIAL WORK

115 or 10% . . . . . DO ONLY RESIDENTIAL WORK

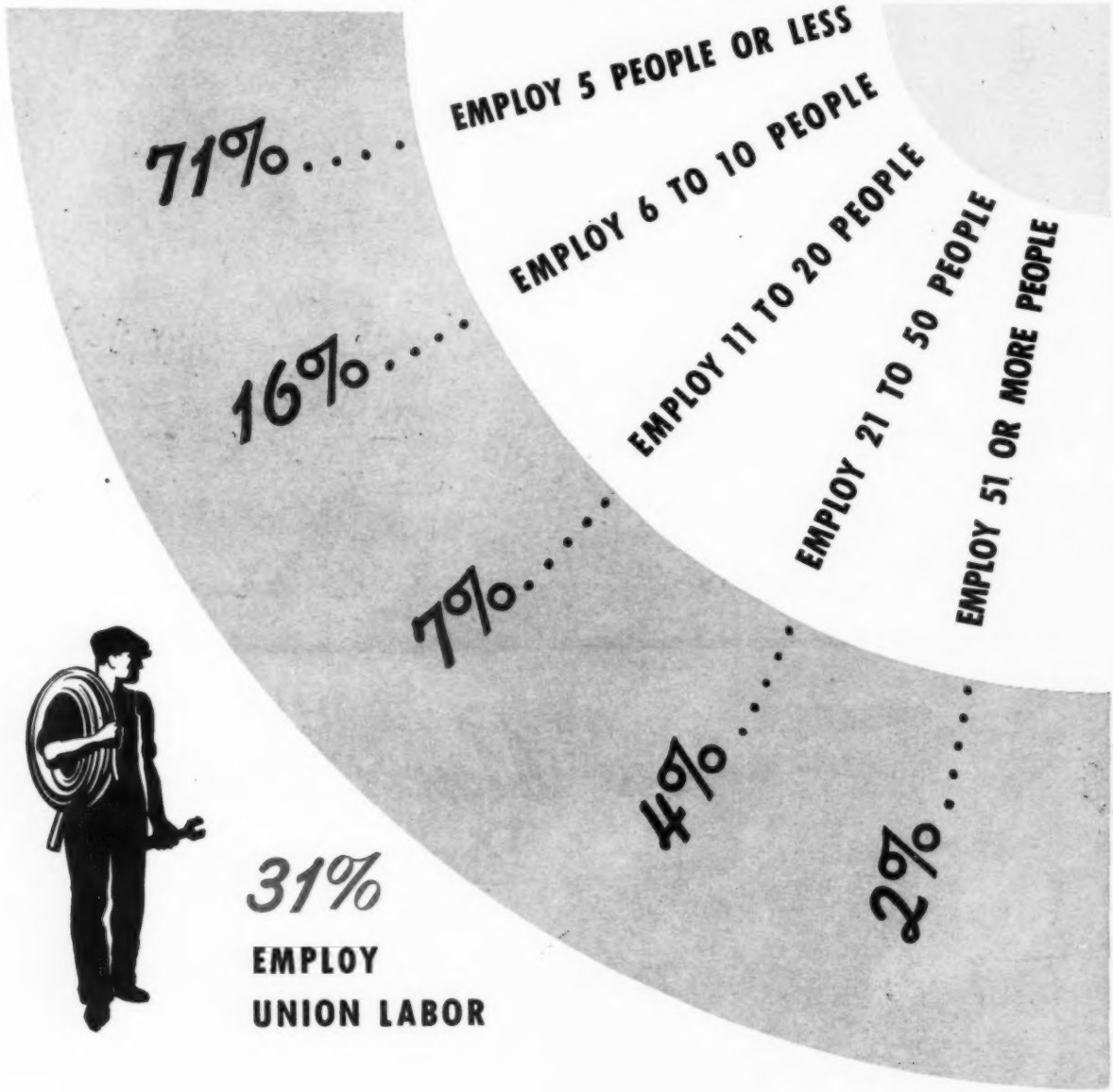


How Much Business Do They Do?

These 1203 Contractors

How Big Are

These 1203 Contractors ?



Their Investment in

TOOLS and EQUIPMENT

829

Contractors report an average investment of $1357 in Contracting Tools

THIS IS AN AVERAGE OF $1357 PER CONTRACTOR

Of these — 348 report an investment of $500 or less
292 " " " " $500 to $1500
104 " " " " $1500 to $2500
51 " " " " $2500 to $5000
25 " " " " $5000 to $10,000
9 " " " " $10,000 or over

246

Motor Shops report an average investment of $1647 in Shop Equipment

THIS IS AN AVERAGE OF $1647 PER CONTRACTOR

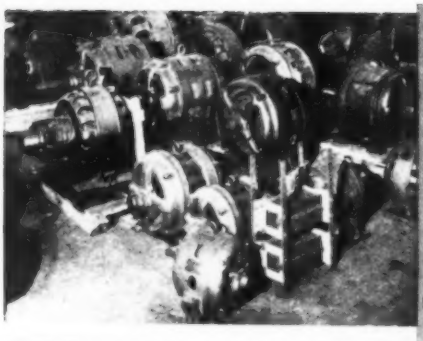
Of them — 134 report an investment of $500 or less
68 " " " " $500 to $1500
17 " " " " $1500 to $2500
11 " " " " $2500 to $5000
16 " " " " $5000 or over

586

Firms report an average investment of $376 in Testing Instruments

THIS IS AN AVERAGE OF $376 PER CONTRACTOR

Of these — 499 report an investment of $500 or less
72 " " " " $500 to $1500
10 " " " " $1500 to $2500
2 " " " " $2500 to $5000
3 " " " " $5000 or over

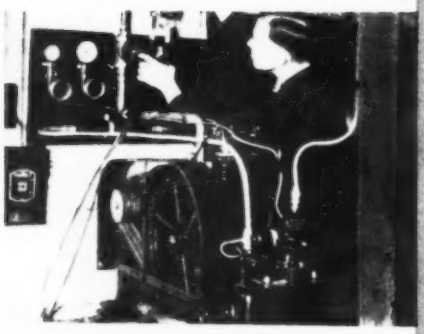


What Else Do They Do?

These 1203 Contractors

22% OPERATE A MOTOR SHOP . . . . . .

51% OPERATE A RETAIL STORE . . . . . .



23% SELL AIR CONDITIONING . . . . . .

55% WRITE ELECTRICAL SPECIFICATIONS . . . .

19% DO INDUSTRIAL MAINTENANCE WORK UNDER CONTRACT . . . . . .

Breakdown of Operations — Five Employer Groups

Average Number of Employees During Year Ending June 30, 1937 — Number of Firms Reporting and Average Volume of Business Done in Each Group.

	5 or Less 796 Contr. Ave. Vol. $12,622	6 to 10 177 Contr. Ave. Vol. $44,484	11 to 20 84 Contr. Ave. Vol. $68,086	21 to 50 44 Contr. Ave. Vol. $195,135	51 or More 21 Contr. Ave. Vol. $343,752
Types of WIRING DONE:		Percentage of Contractors in each group			
1. Industrial Only	1.1%	2.3%	6.3%	9.3%	4.8%
2. Industrial — Commercial	2.3%	10.9%	22.8%	32.5%	57.2%
3. Industrial — Commercial — Residential	55.4%	69.1%	69.6%	55.9%	33.3%
4. Commercial — Residential	27.9%	13.7%			4.7%
5. Residential Only	13.3%	4.0%	1.3%	2.3%	
6. Also doing some Rural Wiring	60.1%	40.5%	30.4%	25.5%	28.6%
OTHER ACTIVITIES					
Operate Motor Shops	19%	45%	32%	45%	35%
Operate Retail Stores	51%	64%	47%	39%	24%
Sell Air Conditioning	21%	30%	31%	30%	9.5%
Write Electrical Specifications	51%	68%	73%	75%	71%
Contract for Industrial Maintenance	18%	21%	22%	25%	19%
MANAGEMENT					
Average Investment — Construction Tools	$1342	$1727	$2440	$5845	$5735
Average Investment — Shop Equipment	$ 848	$ 882	$3104	$9277	$5022
Average Investment — Testing Instruments	$ 234	$ 426	$ 474	$ 680	$1344
Own one truck	63%	39%	31%	21%	15%
Own two trucks*	12%	36%	25%	35%	15%
Rent one truck*	5%	8%	11%	5%	
Employ Union Labor	23%	49%	58%	61%	71%

* In Addition:

77 firms own from 3 to 5 trucks; 9 own 6 trucks; 3 own from 7 to 9 trucks; one owns 12 trucks, and 31 firms rent from 2 to 10 trucks.

The Labor Status of 1203 Shops

785 shops or 65% Do not employ Union Labor
373 shops or 31% Employ Union Labor
45 shops or 4% Do not give their status

Number of Employees:

752 Non-Union Shops Report ..... 3070 Employees, or 4.08 per shop.
355 Union Shops Report ..... 3984 Employees, or 11.22 per shop.
1107 Union and Non-Union Shops Report ..... 7054 Employees, or 6.4 per shop.

The Industrial Contractors

Of 793 contractors who serve industrial plants, 569 or 72% report an estimated industrial business for the year ending June 30, 1937, aggregating $8,615,064.

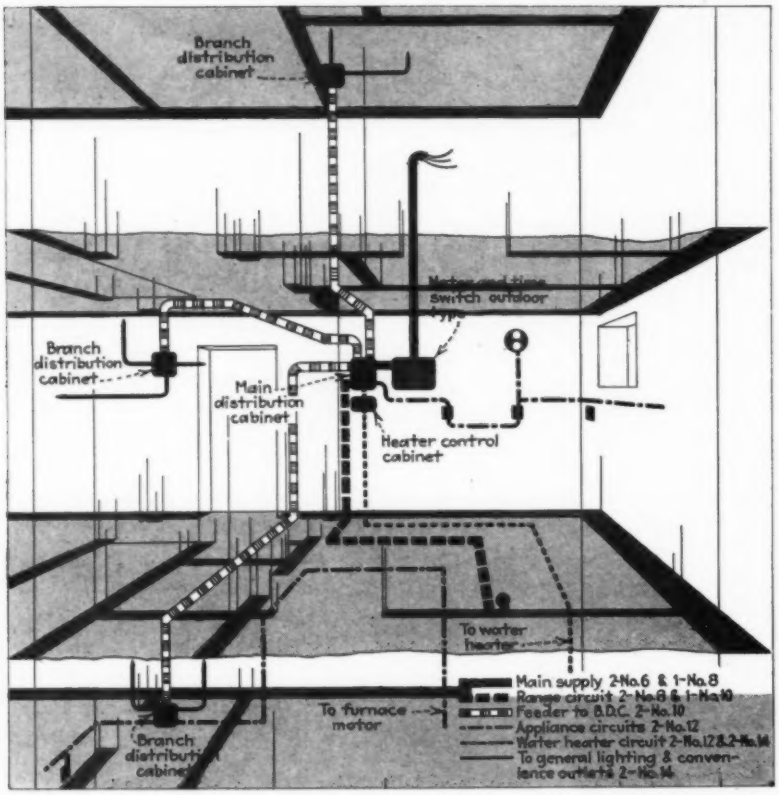
Materials averaged 55% of these billings, a total of $4,738,285 worth of wiring supplies, parts and other electrical equipment.

70	Contractors Do	1% to 9%	Industrial Work totalling	$ 164,724
150	" "	10% to 19%	" " "	1,058,940
130	" "	20% to 29%	" " "	1,529,580
98	" "	30% to 49%	" " "	1,844,908
70	" "	50% to 69%	" " "	1,976,688
51	" "	70% to 100%	" " "	2,040,224
569	" "	Various Amounts	" " "	$8,615,064

Of these contractors 230 do maintenance work for industrial plants.

159	have	1 to 5	plants under contract	
38	"	6 to 10	" "	"
23	"	11 to 25	"	"
7	"	28 to 50	" "	"
3	"	62 to 250	" "	"

DETROIT TRIES "CNX"



SUBFEEDER CIRCUIT *designed to lower the unit cost per outlet as the number of outlets are increased. One essential feature of the Detroit plan.*

By William T. Stuart
Mid-West Editor

THE electrical industry has been watching house wiring with growing concern. In Detroit, an all-industry group decided to do something about it. Called together by the Detroit Edison Company, this group represented the utility, manufacturers, jobbers, contractors and the inspection department. Plans were worked out and mutual cooperation pledged.

The program formulated in January 1937, was based upon the principle that lower unit costs would stimulate the market and in the long run, everyone would gain. That principle, according to its proponents, is fundamental in merchandising. It was decided to give it a try in house wiring.

A study of all available wiring systems was made. Protected neutral cable, popularly known as "CNX" was selected as the basic system to be adopted. It was believed to be cheaper than the alternative methods, more compact and easier to handle.

Under the name of "Trial Installation Cable" it had been tested by Underwriters' Laboratories and temporarily listed for "trial installations." Samples of the cable were also tested by the Detroit inspectors as a further precaution. Samples were first pounded on a wooden block to simulate the most severe handling the cable would receive in installation and then subjected to breakdown tests. The breakdown voltage exceeded 900 volts from neutral conductor to ground and in excess of 10,000 volts between conductors.

Permission was obtained to install a specified number of jobs under "trial installation procedure" with close engineering and inspector supervision. Through the cooperation of the manufacturers, a simplified service switch and fuse cabinet was developed. Wir-

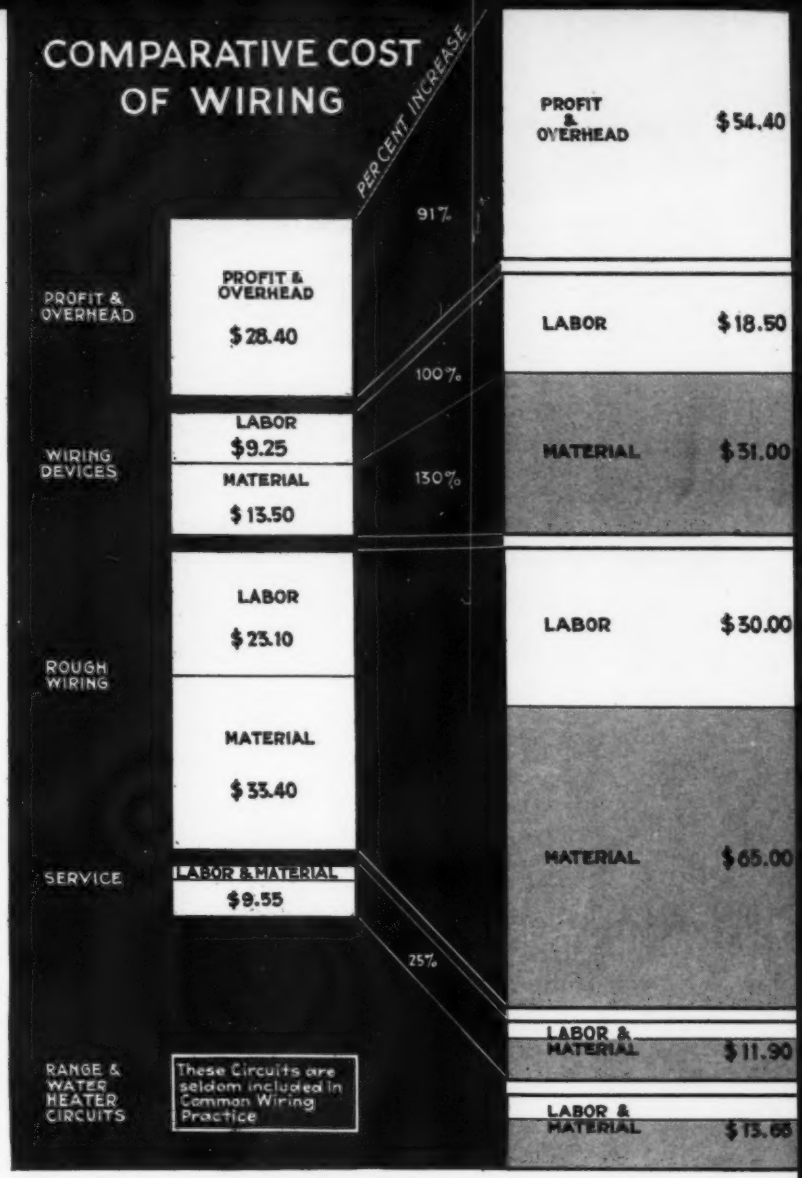
UTILITY ENGINEERS *check over the work on the job during roughing. W. S. Young and W. W. McLean of the Detroit Edison Company with Andy Rogerson, contractor.*

SPECULATIVE BUILDERS *are still the biggest buyers of house wiring. A row of houses in a Detroit suburb with CNX wiring systems.*

DETROIT MAKES A COMPARISON

COMMON PRACTICE LAYOUT—*How a 30 amp service, with limited circuits, outlets and controls, compares in elements of cost and contractor profit with the Detroit plan for a complete job. Right 1st column*

COMPLETE SYSTEM—*Here 60 amp. service, 14 branch circuits, with cooking and water heating supply, provide for 165 electrical conveniences. Extreme right column*



COMPARISON *of relative costs of common practice wiring and the system proposed under the Detroit program*

ing materials were standardized to further reduce costs. Also a subfeeder layout was designed to permit expansion of the wiring program, in the direction of higher copper capacities and greater adequacy.

A selected group of house wiring contractors was asked to meet with the utility engineers for specific instructions and training in the new wiring system. Each job required a separate request to the inspection department for permission to proceed on a "trial installation" basis. The importance of accurate statistical records from the beginning was emphasized. An arrangement with the inspection department withheld special permits from any contractor until he had been instructed by the engineers and cooperated with the general program by providing accurate records of his jobs and the number of outlets on each.

BORING *Ceiling joists with machine. Good tools are essential to the fast labor schedule maintained in new housing wiring.*

CABLE HANDLING *by this expert house wireman is a fast job. A cable reel suspended in the doorway keeps the cable off the floor and out of the way.*

Not long ago I spent several days in Detroit, looking over the CNX jobs, I went around with the utility engineers, talked with the inspector and several contractors, some who were using this material and some who were not. Apparently, in the beginning the house wiring contractors were generally opposed to the program. As one man stated it to me—

"My men were accustomed to handling Romex and a change would not only make my stock obsolete but would slow down my work."

These objections were overcome in some cases by furnishing the contractor a small stock of CNX and asking him to give it a try. Those who went along with the program gradually became reconciled and sold on the program with the result that other contractors fell in line. Today there are about thirty house-wiring contractors on the list approved by the inspection department to install CNX under trial installation procedure.

Among the first to tackle the new wiring system was the Rogerson Electric Co. With a crew of three or four expert wiremen, Rogerson handles about 500 house jobs a year. He reports that roughing in time is reduced about 10

(Continued on page 55)

ASSEMBLY LINES *lighted by a continuous indirect lighting unit. The bottom of the unit is 46 inches above the working surface giving an even intensity of 40 foot candles down the entire line.*

LABORATORY BENCHES *are lighted by individual 10 foot sections. The character of the ceiling is unimportant, as this type of unit provides its own reflecting and diffusing surface.*

ASSEMBLY LINE *Lighting*

PRODUCTION men are usually willing to listen to a contracto rwho can show them how to decrease production costs. In recent years most of the attention has been given to smoothing out the mechanical details in assembly lines. But little thought has been paid to the profitable effect of uniform illumination. Yet because ceiling obstruction and structural conditions often make it difficult to install a lighting system which will give an even spread of light over the entire assembly line, there is a job to be done.

Galvin Manufacturing Company, pioneer in the automobile radio field, recently added a home radio to its lines. So as the former plant was pressed for space, a new modern plant was built in Chicago during the past year.

For lighting the 2150 feet of assembly line, the company selected the Curtis "Light-Hood" indirect unit. This type of lighting eliminates the ceiling difficulty as it provides its own ceiling. The equipment is hung over the assembly lines and furnishes uniform illumination on a working surface, 74 inches in width, where lines of assembly benches were placed back to back. The test laboratories were equipped with individual 10 foot sections.

In this plant glareless illumination is diffused to the working surfaces with a uniform intensity of 40 foot-candles, and as direct light is practically shadowless, the task of assembling small parts in the radio chassis is greatly facilitated. Standard 150 watt Mazda lamps on 30 inch centers are used in the reflector trough of the unit, and every group of four lamps is controlled by levolier pull switches, for use when only sections of the line are in use.

As the wiring trough at the bottom of the reflector contained adequate space to carry the circuits for each 125 foot line, the wiring was brought in at the center, feeding both ways with #12 asbestos covered wire. The "Light-Hoods" were fastened to pipe battens by means of standard pipe straps on 5 foot centers. The battens were suspended from the ceiling on lockweave chains. Turnbuckles were installed in the chains to facilitate the exact leveling of the lines. The chains, on 14 foot centers, were dropped from lag bolts driven into every other ceiling beam. The lighting units and wiring were installed by the Kil-Bar Electric Company of Chicago.

WAREHOUSING

LARGE MOTORS

HEAVY APPARATUS *is kept in this 60-ft. by 208-ft. central bay, where a traveling crane makes floor-skid labor unnecessary. A 25-ton hook takes the big ones and the 10-ton auxiliary hook takes medium-sized loads.*

CAR UNLOADING *is by crane-power at the particular bay for which the shipment is intended.* (*Right*)

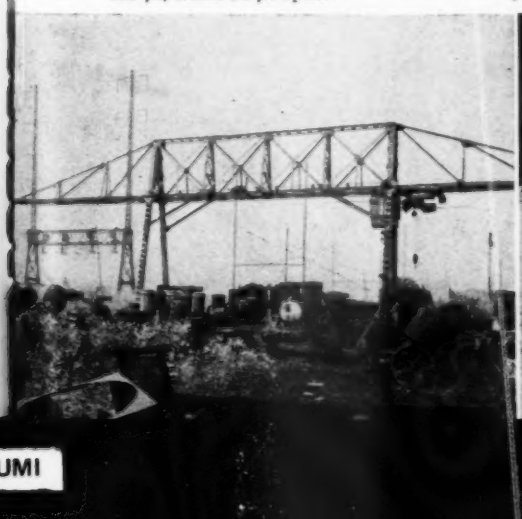
MOTOR STOCKS *are tapered off in size to tiny fellows at the opposite end of this side bay. A high-speed 5-ton traveling crane operates on 208-ft. of travel.* (*Extreme right*)

WHEN stocks of heavy electrical apparatus grow to the proportions of the George Sachsenmaier Company's normal $200,000 inventory, the equipment handling problem warrants elaborate labor-saving facilities. There must be plenty of elbow room for handling large transformers, generators and motors, without getting in the way of the smaller types of equipment that are moved along at a steady pace. So this company found it necessary to spend big money in order to effect warehousing economies.

About eleven years ago they obtained a 10-acre site at Holmesburg, Pa., alongside the main line of the Pennsylvania Railroad. This handy location solved the rail shipment problem. Here a building 126 ft. wide and 208 ft. long was erected, arranged for efficient motor warehousing, based on an experience of twenty-two years. Since erecting the main section a 56-ft. by 110-ft. shop wing has been added to provide more space for shop equipment.

The accompanying views show the types of equipment this company's crews must handle, and how the arrangement works out to avoid jam-ups or delays in getting out big rush orders of heavy electrical apparatus.

YARD HANDLING, *direct from railroad cars, carries anything up to heavy transformers, at left. The gantry crane is 30-ft. high, spread 125-ft., tracks 50-ft. apart.*



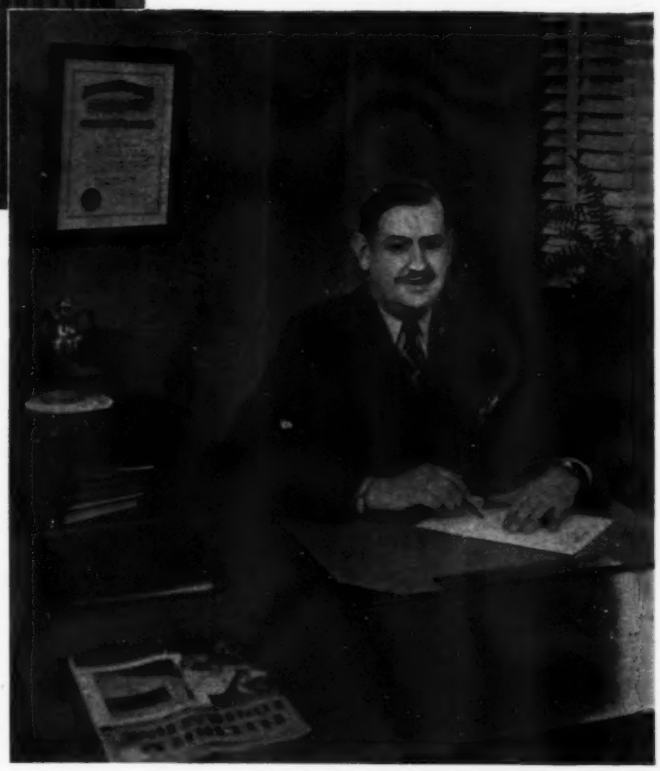
ROLLING STOCK, *such as this flat car at the railroad shipping dock, provides rugged transportation to points within the six acres fenced in for this plant.*

CONNECTING BETWEEN *the outdoor craneway and the plant is trackage for heavy-duty plant trucks or freight cars. Auto shipments are handled from a rear loading dock.*

Looking in on GE

Sixth in a Series of Informal Visits to Interesting Contractors

SOME BIG ONES—*He did this job in the Ontario Parliament buildings. The one at the left is George.*



GEORGE W. PATTERSON—*in his corner up in Toronto*

By Earl Whitehorne

IT is a funny thing how people get into the electrical business. With George Patterson up in Toronto, it was all because of a milk man. He was thirteen—I mean George—and had already been a business executive for two years, operating a large daily newspaper route with a lot of vice-presidents in-charge-of-side-streets working for him. He decided to stabilize his operations by expanding into another industry.

That's where the milk man came in. But the son-of-a-gun had insomnia or something and couldn't sleep nights. He started out every morning with his milk wagon at three o'clock, and George was to be his vice-president-in-charge-of-back-porches. It presented a real problem, because George couldn't wake up that early—and the wagon wouldn't wait. He wrestled with the matter and finally bought him an electric bell and a push-button and a couple of dry batteries. He installed the button on a tree at the roadside, the bell on the headboard of his bed and put the batteries under his pillow. But the damn thing wouldn't work.

George sweated at it all day in school behind his geography, figuring out connections on paper. About 2:30 he saw the trouble and yelled—"I've got it!" to one of his assistants who was waiting three desks away. And when they let him go home along about five, George fixed it up and the bell rang! Next morning the milkman pushed the button, George leaped into his waiting pants and boots—rigged like a fireman's between two chairs—slid down the porch roof and landed in the dairy business.

All this made a big impression on George. He could see that this electricity was up-and-coming stuff. Summers he was general manager of a horse and wagon for a grocery store, and when he finished public school he got a job with a railroad. But that push button had poisoned his mind and one day he quit his $30 a month easy money with the Canadian Pacific. He hired himself to an electrical contractor, Harris & Marson, for $4 a week and realized his heart's desire.

Next morning he turned up on a construction job and got a big laugh. For George was long and skinny—no foolin'. He weighed 125 pounds and wore bicycle pants. But you can't keep a good man down, as Old Jonah used to say. This happened just 25 years ago.

Then the World War came along and Patterson enlisted in the Canadian army, detailed to a special service battalion on signal work. Sickness followed and kept him from getting to France and that probably saved him for our industry, because the Canadian troops went into the worst of it.

In 1920 George went into the contracting business on his own and incorporated the firm of Patterson Electric, Limited. Since then he has been steadily at it, specializing in industrial and commercial work, with headquarters in an office building down-

GEORGE PATTERSON

town. He has to his credit a long list of factories, commercial buildings, schools, hospitals and other institutions, substations, bridges, sports fields and the like. He does work all over the Province of Ontario and regularly employs from 15 to 25 men. He has a centrally located shop and stock room, and another shop in the north end of the city where he has a gang of electricians and plumbers. From this shop he handles a contract with the Toronto Hydro, the local power company, installing electric water heaters on a mass production basis. And that's another story.

But George Patterson has had another idea, besides just being in the electrical business and making a good living. He likes to work for progress. He has an abiding conviction that cooperation brings not only financial opportunities but the priceless privilege of self development through service. And so he has been an organization man.

Way back yonder, he held a card in the IBEW. He now operates a union shop. In 1921 he became a member of NECA. In 1923 he went on the Executive Committee of the Ontario Electrical Contractors Association and in 1927 was its president. In 1925 he was elected to the board of directors of the Electric Service League of Toronto, and was vice-president and then president. In 1927 he was put on the Electrical Code Committee of the Canadian Engineering Standards Association. In 1928 he initiated and was president of the Electrical Estimators Association. In 1929 he got married—more successful team work. In 1930 he went on the board of the Electric Club of Toronto. In 1935 he became NECA Executive Committeeman from the five eastern provinces of Canada, and was made chairman of the NECA Cost Data Committee.

The job he has done for NECA was attested in October in Los Angeles, where before the big convention he received the James H. McGraw Award Contractors Medal for his contribution to the art of estimating. That presentation brought a fine reflection of the character of the man. George was completely surprised and overwhelmed at the acclaim of the one thousand people gathered that night at the brilliant convention banquet in the beautiful Biltmore Bowl. He made a graceful acknowledgment of the honor, as the Britisher always does, and didn't remember another damn thing that happened. One of the best floor shows I ever saw was entirely wasted on him.

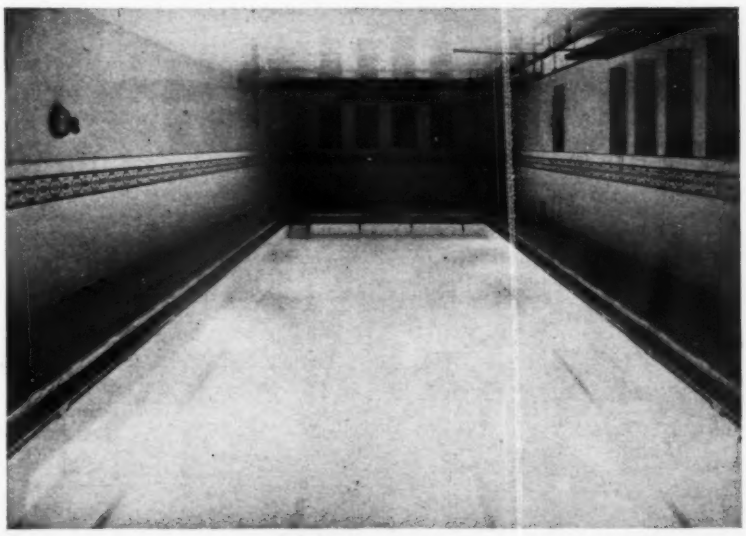
But the tribute was well merited. For George has worked nights without end in a little room in his house, reorganizing the NECA Labor Units Service, and made it one of the most valuable resources of the contracting industry. When he took over, he saw the opportunity to develop the NECA cost data into a progressive service to estimators. He worked up the interest and cooperation of other contractors and out of it evolved the present system.

But it was not easy. What you see in the black book is built of sweat and toil. It was the pressure of his unabating enthusiasm, the stimulus of his own fine example that made it possible. And there are few electrical men who have willingly sacrificed so many hours of their personal time and leisure and expended as much energy for the advancement of their industry.

JOB SHACK—*and some of George's gang losing time to oblige the camera.*

George sticks to his knitting. He was born less than a mile from where he lives. He is a Mason. He has been treasurer of his church for six years, and on the church board. He has been secretary of the Sunday school for 25 years. He belongs to the Toronto Board of Trade, the Illuminating Engineering Society, the American Institute of Electrical Engineers.

But he is electrical all the way through. I went home to dinner with him one night and you ought to see the way his house is wired. It's the last word in equipment and control. The floors of my house are littered with lamp cords where I have been meaning to put in more outlets for 15 years. But George has switches at every doorway, three master control stations, intensity controls in the principal rooms and waiting receptacles wherever you can poke a plug. He figured it all out behind a geography book in that little room where he nurses his labor units.



UNDER WATER LIGHTING—*Patterson works anywhere. In this case, the first submarine job in Canada, a Toronto High School.*

CHICAGO SKYSCRAPER—*The Field building is the first to be equipped with the new system of electric air cleaning.*

ELECTROSTATIC AIR CLEANING

Electrical precipitation of dust opens a new field for the electrical contractor in many industrial and commercial applications.

THE first large installation of electrostatic air cleaning applied to office building ventilation has been completed recently at the Field Building in Chicago, Ill. Although thousands of tons of dirt per square mile are annually deposited in the loop area of Chicago, the air in this building is hailed as the cleanest in the world.

The installation, as made by the Field Building electrical staff, consists of 18 batteries of precipitation cells in the main air circulation ducts feeding the arcade and first four floors. Each battery is connected by neon sign cables in conduit to a high voltage direct current power pack mounted on the outside of the sheet metal housing. Limit switches in the power pack and on the access doors to the housing are interlocked with the power supply, interrupting the primary circuit if the doors are opened while the power is on.

In operation, the air passing through the cells is first bombarded by minute electrical charges emitted by five tungsten wires charged to 12,000 volts. The ions given off attach themselves to particles of matter in the air, giving them an electrical charge. The treated air is then drawn through the precipitator cells, consisting of alternate high potential and grounded plates charged to 2,000 volts. As the treated air passes through these plates the charged dust particles adhere and the air passes on into the ventilating ducts cleaned of all solid matter.

The Field Building installation is capable of cleaning 272,000 cubic feet per minute. In a year's time it is estimated that the system will collect 600 bushels of impurities, 90 per cent of which will be particles one-hundredth the diameter of human hair.

(CONTINUED ON PAGE 36)

PRECIPITATOR CELL—*thin aluminum plates charged to 5,000 volts, that collect the dust.*

POWER PACK *that supplies the high voltage direct current. Switches open the primary circuit and relay discharges the condensers.*

ELECTROSTATIC —*Cleaning apparatus. The white cabinets supply high voltage to cells within the sheet metal housings.*

MEETING THE NEEDS OF *all four*

UTILITY—Because it helps build and meet the all-important customer good will because it reduces service calls and can be tested without interruption to service because it can be installed readily, quickly and economically.

HOUSEHOLDER—Because a woman doesn't have to be afraid of this switch; it's safe, simple, easy to understand; styling and appearance harmonize with the modern construction; the new panel finish takes any color to match the home decoration scheme; it provides reserve service capacity.

WHOLESALER—Because it offers wanted and wanted features, a wealth of talking points because it offers a new approach to the problems of installation, maintenance and operation—creating a hearty, cordial demand on the part of everybody concerned.

Geared to the 1937 New National Electric Code, C-H 4334H17 Switch provides the wanted 60 ampere service at little more than 30 ampere cost.

CONTRACTOR—Because it is easy to sell singly or in gangs; because all work is done from the front of the case; because a screw driver or ½" socket wrench makes all connections; because it gives the big bonus in value that makes permanent friends; because it provides the extra capacity so much in demand.

The New C-H Fuseless MAIN SWITCH

Seldom does any new electrical device meet with the instant and continued success that has greeted the new Cutler-Hammer Bul. 4334H17 Fuseless Main Switch. But even the most cursory examination of the features tells why this is so.

1. Fuseless main circuit with silver-to-silver contacts which eliminate interior heating, service trouble, and give efficient long life and which permit a new standard of compactness.

2. Outside toggle disconnect switch which permits safe branch fuse renewal . . . something even the most timid woman can approach with confidence.

3. 60-ampere service at little more than 30-ampere cost—providing reserve capacity for years to come.

4. Universal mounting with off-on markings reading correctly either way.

5. Simple easy access to all parts whether flush or surface mounted; all work done from the front with simple tools.

6. Provision for sealing door and cover with standard meter seals.

7. Both main and branch circuits tested without interruption to service.

8. Modern, attractive appearance; mar-proof and flake-proof finish.

No man connected with the domestic consumption of electricity can afford not to know full details of this switch. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus,* 1306 St. Paul Ave., Milwaukee, Wis.

CUTLER-HAMMER
SERVICE EQUIPMENT
C-H

Editorials

Earl Whitehorne, Editor

Wire Ratings Too Liberal

In 1889, Dr. A. E. Kennelly published in *Electrical World* a set of current-carrying capacity tables for rubber-insulated wire. These values have prevailed with but little change in the National Electrical Code ever since. But recent studies by eleven wire manufacturers indicate that present Code ratings are actually too liberal, and that something should be done about it. This is a serious implication in the face of modernization programs and the steady trend toward higher load values for all types of interior wiring systems.

According to these studies, Code grade rubber-insulated wire, when operated at NEC current values for eighteen days at the 60 deg. C. temperature permitted by A.I.E.E. standards, deteriorated far too much. Safer limits were found at 50 deg. C. This led to exhaustive research as to the temperature rise of conductors, when loaded to permissible Code ratings, under various conditions. It disclosed a need for consideration of the room temperatures, and the use of proper correction factors to limit the resultant temperature rise to the characteristics of the insulation.

All of this may seem too complicated for consideration in future Code rules. But eventually a table of practical correction factors may be found. Already recommended values are offered for consideration.

In cool areas, conductors would have safe capacities in excess of the Code. But in the large majority of industrial and commercial buildings, where room temperatures usually run rather high, the inspector and contractor would work to a basis of practical understanding. They could apply a yardstick that would do away with premature conductor failures and excessive voltage drop. This might by-pass the industry's bugaboo—the lack of adequacy in conductor networks.

Farm Wiring Neglected

At a recent meeting in Chicago, a group of over one hundred men sat down together to talk about wiring—farm wiring. It was the fall meeting of the Rural Electric Division of the American Society of Agricultural Engineers. A learned group—the state universities were well represented—wrestling with the problem of adequate wiring on the thousands of farms that are getting electric power for the first time.

R.E.A. had men there, and the utilities and the manufacturers, and the inspectors. They were all there lending their able council. They were there to look after their interests, to sell kilowatt hours, to sell pipe and wire and to eliminate costly fire risks. Contractors were absent. Not conspicuous by their absence, just absent. And they received consideration in direct proportion to their representation.

Anyone connected with the electrical industry knows that farm wiring is not a layman's job. It requires the skill of trained craftsmen backed by competent technical knowledge. But who will tell that to the farmer? The farmer won't know it until his barn burns down. And then he will be a grade Z prospect for anything that looks like electric wiring.

The utilities, manufacturers and inspectors have served the industry well in their efforts to get electricity down on the farm. And the policies that they set up will influence tomorrow's market for electric wiring, and not only on the farm. But the men who are shaping these policies should have the experienced council of the electrical contractor. The contractor should be doing his share in this farm electrification job—and at the same time looking after his own interests.

If Housing Comes Along

Wide interest waits on the outcome of the President's proposal for mass production in low-cost housing. It holds great possibilities, involving big figures for any part of the building industry—nails, door knobs, switch plates or kitchen sinks. Simple arithmetic applied to 800,000 new homes per year brings breathtaking totals in manhours.

But what will be the essence of our typical low-cost electrical specification? When costs are trimmed, the electrical job is too often held below normal standards of comfort. For the Code can only safeguard basic minimums. Beyond that point the industry is charged with full responsibility to fight a battle.

We wonder, when the smoke clears, and our housing shortage has been remedied, what our score will be? Will we have added 4,000,000 systems of strangled wiring to those 22,000,000 that now stand as our indictment?

Now is the time to head it off. How? Set up and promote recommended minimum budgets for comfort wiring. If a $4,000 house includes a 4 per cent electrical allowance, it means $160—no more. For there is little time to go into long consultations on individual plans, switches for this and plugs for that. But if sensible percentage allowances are advocated at the start, electrical specifications will automatically include details that are otherwise gone with the wind.

You And The Code

The average contractor has a careless attitude toward the Code. He believes in it. He wants to abide by it. But his attitude is passive. He relies on violations to keep him in touch with Code progress.

It doesn't make sense when you stop to think of it, that any contractor should wait for his local inspector to tell him of Code changes. When his men do something wrong that wastes time and money. And it gives that contractor a bad name. For everytime a job is held up for a violation, the customer says—"Why doesn't this bird know his Code? That's bad for reputations.

We have a new Code now. Study it. Have all your men study it. If something is not clear, ask your inspector for an interpretation. If that does not satisfy you, write to headquarters. But know the Code in advance of your need. Ride the Code. Don't let it ride you.

Your inspector is doing an important public service. He is protecting you against mistakes your men may make. Support him by attending the local meetings where the Code is discussed. Give him your viewpoint. Know his attitude. Be on the inside.

You've Got to Sell —and Like It

Life is just one long and interesting selling job. What you get from start to finish depends on how well you sell yourself all along the line. And nobody's job grows and earns him more pay or better opportunity unless he builds it. And we build by selling.

So what happens to an electrical contractor who just sits back and waits for business to roll in? He can't keep up with the chap who hustles around and sees his customers. And the motor shop must advertise and ask for business or its volume dwindles and the bank account dries up.

The chief electrician of a factory often thinks that because he has only one customer he has no selling job. But maintenance needs selling all the time. A plant that does not constantly improve its practice by adopting new ideas steadily becomes more obsolete and inefficient. It happens automatically no matter how well the repair work is done. And it needs better selling for a plant man to convince the management that system improvements must be made, than for a contractor to come in from outside and give advice.

The biggest menace to success in this business is the mechanical mind that refuses to be interested or to exert itself to sell new ideas and build a better job, a bigger volume. But you can't sidestep the need for selling—short of the grave.

Back Talk

We Need Young Men

To the Editor—I hope, for the good of your industry, you will continue to explore apprenticeship. It is the very keystone of the trade. I know of not more than a dozen men who have grasped the true significance of apprenticeship. Contractors feel that they assume too much responsibility in indenturing apprentices. Yet these same men sign contracts for jobs running into hundreds of dollars and they do it without batting an eye.

Why do these contractors hesitate? Simply because they are not sold to the apprenticeship idea. They prefer that their learners go to the evening school, and keep on the job all week. But if the apprentices are indentured, then there is some control over the kind of instruction they are getting. By having them go to the evening school you save a little money, but at the expense of the learner and the industry generally.

The result is no control over apprenticeship except what the union can exercise. But there is nothing to prevent an electrical learner in one city setting himself up as a contractor or journeyman elsewhere in the state. That's the problem that ought to be worrying the contractors. They will never succeed in improving the situation until they cooperate in indenturing every last learner coming into the trade.

Walter F. Simon
Madison, Wis.

Despite the fact that so few see the smoke, this matter of need for apprentice training is a vital, burning issue. The average age of journeymen is growing steadily higher. But nothing is being done to recruit young men and fit them for the work. And the collosal job of re-wiring all America lies right ahead of us.

Two Lessons in Toronto

To the Editor—At the recent convention of the Electrical Leagues, a very excellent paper on "Adequate Wiring" was presented by M. E. Skinner of Buffalo. He touched on "Red Seal" as a wiring promotion method, and found in it what he considered certain defects. One was that the rigid specification set up by Red Seal was not elastic enough.

What we have accomplished in Toronto in obtaining about 25,000 Red Seal certified homes, on about 85 per cent of all the building for years back, is based upon this idea that mass volume is the most important thing in adequate wiring. The higher class homes more or less look after themselves.

The industry's problem is to bring up to reasonable standard the smaller type homes. We have proven, from long experience, the truth of this argument. Our method has created a great volume of heavy services, range leads to kitchen, and extra outlets—far more than could ever have been created by any system of attacking the problem from the higher class home angle first.

G. W. Austen, Manager
Electric Service League, Toronto

Certainly Red Seal has worked in Toronto. But the biggest factor has been the zeal and persistance of one George Austen, who had a vision and would not let it fail. There are two great lessons in Toronto—Red Seal and George Austen.

The Plan Will Work

To the Editor—You will get nowhere putting on a program in any city where contractors are going to do the whole job. They have never done so and it is hardly likely they ever will. Unless some local electrical association or public utility takes the matter in hand, it will stop before it begins. The real cause of the trouble is the cost of wiring.

You will not get the larger contractors to interest themselves in house wiring. They would be interested of course in wiring commercial and industrial premises so as to bring the wiring in these places up to a reasonable standard. But the wiring of the home will be done by the small contractor. I am afraid you are up against a disappointment in attempting to get more outlets in homes if you cannot conceive of a better plan to do it than the one outlined.

E. W. Lloyd, Vice President
Commonwealth Edison Company

Maybe. But the small contractor cannot tackle this job of rewiring 22,000,000 homes. We believe it offers enough profit on a mass production basis to interest the large contractor. He does not see it now. But he will. Of course, these large contractors will need the help of utility and league. This we have always urged. And, of course, with mass production costs will come down.

Why Not Govern Yourselves?

To the Editor—I have observed union conditions in the very small country of Belgium. There you cannot have a job of any kind unless one belongs to the union. Surely what can be accomplished in so small a country can be accomplished here.

If I tried to run a union shop here as things stand I would be out of business in six months. On the other hand I would be a happy man if this town and its surroundings were under some clean union banner.

Protection is what we need. The large cities are unionized. Why doesn't someone spend a little effort in the small communities? Are the small communities to be left on themselves to be eaten up by the big ones?

I am getting along, yes, but that is not the idea. The point is that something can and should be done to keep out those fellows who only know enough to stretch a pair of wires and charge 50¢ for it. They have a pair of 10¢ pliers and a 5¢ screwdriver and that is that. We charge 75¢ an hour and that seems way too much for many people here, just because there is no organization among the few fellows here.

A. S. Van D.,Ohio

Small contractors can establish good business practice for themselves. A "clean labor union" is a good thing. But good work and good service commands a price. Why wait?

He Says Keep Biting

To the Editor—I want to congratulate the electrical contractor in that he now has an educational magazine devoted to his betterment. The editorial policy now followed has a bite to it and salve to ease the wound.

I have been moved to write you more particularly on your editorial "The Trouble With Us." That is a theme warranting constant emphasis. Use your forceful pen in keeping electricity safely harnessed through proper safeguards—the code, experienced workmanship in installation and thorough inspection.

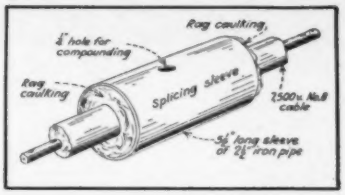
Teach the contractor to use his cooperative power in demanding that all electric installation be done by trained and experienced contractors. Put "the lads with step ladder and ten dollars worth of tools" out of their chiseling, unsafe game. Let the contractor stimulate business that will be done only in the right way. All work, no matter how trivial must be done safely under a strict electrical standard for wiring.

The end sought justifies your continued efforts. Keep up your good work.

F. C. H.

This good friend requests that his name be not published. But what he says deserves repeating. Thanks for the praise—and the counsel.

WIRING Methods



EXPENSIVE WORKMANSHIP — *Crude methods of splicing underground street lighting cable by incompetent mechanics made a big repair job.*

A MODERNIZED FIRE JOB

When fire recently destroyed the 20-year old main switchboard room of the Atlantic Steel Castings Company at Chester, Pa., Harry A. Hynes, local contractor, went to work on a $10,000 job of modernization. First came an 8-man rush job of temporary connections. They began on Saturday morning after the fire, and the plant was operating on Monday morning.

The old board was a complete loss so a new switchboard was placed in a new power distribution and compressor room, where two 200 kva., 2-phase power transformers and two 25 kva. lighting transformers were installed. New feeders were run to various load centers from this board.

The switchboard layout includes a 1500-amp. 2-pole secondary main coil circuit breaker, four 400-amp. circuit breakers with dead front disconnecting switches, four 200-amp. and six 60-amp. circuit breaker feeder circuits. At the extreme right end is a remote-controlled panel for a new 450-h.p. 2300-volt synchronous compressor motor. This motor operates from the primary service, and thus relieves the power transformers for handling a gradually increasing load in 220-volt 2-phase motors throughout the plant.

NEW DISTRIBUTION—*Fire destroyed 20-year old main board, so new dead-front circuit breaker equipment was installed at a better location.*

DOUBLE RELIEF—*New 350 h.p. synchronous motor operates from 2300-volt primary service, relieving overloaded power transformers, and also boosting power factor.*

SPLICE FAILURE

Lack of experience in handling street lighting cable work recently brought a city in West Virginia a $625 electrical repair bill. It also cost $125 more for replacing new paving on an almost new job. The Beckmeyer-Davis Company, of Huntington, had to take care of the mess that an inexperienced mechanic had made as an employee of the city.

Random splices had been made to 7,500-volt, No. 8 street lighting cable, and then covered with concrete paving. A number of these splices were enclosed with improvised sleeves, consisting of 5½-in. lengths of 2½-in. steel pipe. These pieces of pipe were stuffed at the ends with rags, and sealing compound was then poured in through a ¼-in. hole that had been drilled near the middle.

Trouble developed in three of the feeders of this system and required outside help to make repairs. When the electrical contractor located the faults and dug up the new paving, these crude splices were found to have broken down. The sleeves of the several splices had slipped along the cable and away from the splice when concrete was poured. Moreover, none of the pipe sleeves were more than one-third filled with compound. The cable failures also resulted in damaging controllers for three feeders. This damage was said to have occurred largely because the control equipment had not been inspected for seven years and was very low on oil.

BUSHING-LESS BOX STUBS

The make up of turned-down conduit runs to the back of knockouts of outlet boxes was accomplished with comparative ease by the Iron City Engineering Company of Pittsburgh. In wiring the Mellon Institute of Industrial Research, most of the circuit runs were 1-in. conduit, and 4⅛-in. square ceiling boxes were used.

NO LIFTING—*Locknut clamp holds stubbed conduits in outlet boxes, eliminates attachment of bushings until form is wrecked.*

Where the conduit connections were elled into the backs of such boxes, a spider clamp was placed over the lock nuts to hold the conduits in the box

WIRING Methods

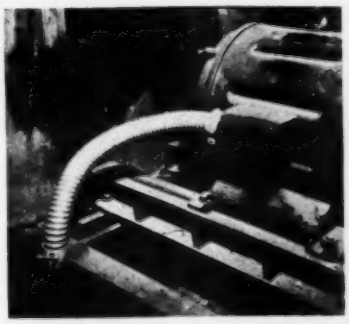
[FROM PAGE 24]

knockouts. Conduit bushings were not attached inside these boxes until the concrete forms were removed. A ¼-in. machine screw which holds the spider in place is screwed into a tapped fixture stud within the outlet box.

ALLOW FOR TAKEUP

Adjustable-base motor drives must have flexible motor connections that are reasonably protected against rough treatment. Here is how it was done by The Lamp Shoppe in Hagerstown, Md. at a 40 h. p., V-belted motor.

The 2-in conduit elbow was stubbed up at a sufficient distance to the left of



SAFE FLEXING—Correct placing of rigid conduit leaves flexible conduit free to bend as motor is moved in taking up belt slack.

the motor terminal housing to permit the short piece of flexible steel conduit to "flex" as the motor is moved back toward the conduit. With a reasonable flexing radius the 1/0 conductors supplying this motor are not likely to become pinched, nor will the adapters pull away from the flexible steel conduit.

SERVICE FOR A BUILDING-IN-MOTION

While this Hartford, Conn., store and warehouse building was being moved to a new site eighty feet away, business went on as usual. The workers in this eight-story building had light and power without interruption, as a result of a novel temporary wiring job. H. H. Mandly, electrical contractor, of Hartford, installed the work.

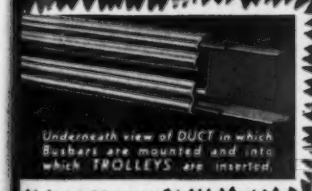
A bank of transformers was installed

This Factory Has Flexible LIGHTS · ON · WHEELS

with

UNIVERSAL TYPE **Trol-E-Duct**

The movable, current carrying TROLLEY



Underneath view of DUCT in which Busbars are mounted and into which TROLLEYS are inserted.

Cross Sectional View, Showing Rolling TROLLEY Inserted in DUCT

Lighting Fixture attached to a TROLLEY which acts as both feeder and movable means . . . Any type of Lighting Fixture can be adapted for use with TROL-E-DUCT.

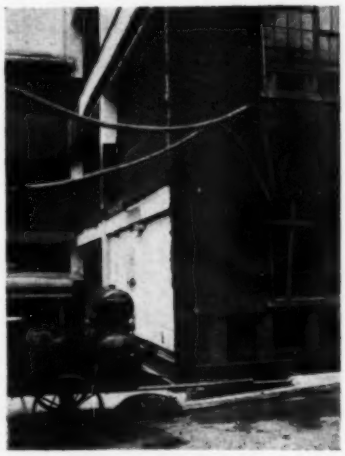
Bull Dog Universal *Trol-E-Duct* provides a Flexible System of Lights on Wheels . . . Designed for surface mounting it can be readily installed in either Old or New Buildings . . . Lighting Units may be inserted in the Duct runs at any time and placed to the best advantage with respect to Machinery or Equipment locations . . . Consequently it is not necessary to know the exact position of the latter, before making your Lighting layout . . . Every inch of the Duct is a potential source of current for Lights or small Portable Electric Tools . . . Investigate this low cost flexible Electrical Distribution System . . . Available for 10-Ft. or 10,000-Ft. installations.

Write for Illustrated Bulletin

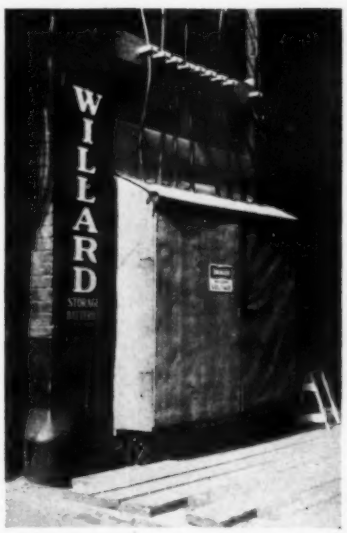
BULL DOG ELECTRIC PRODUCTS COMPANY

Pioneers of Flexible Electrical Distribution Systems

in an adjoining building and connected to an outdoor switchboard. Flexible cables of extra length were run over the roof and into a window of the moving building, connecting to the building's permanent service switches. The leads were measured to allow sufficient length to reach from the temporary switchboard to the ultimate location of this building.



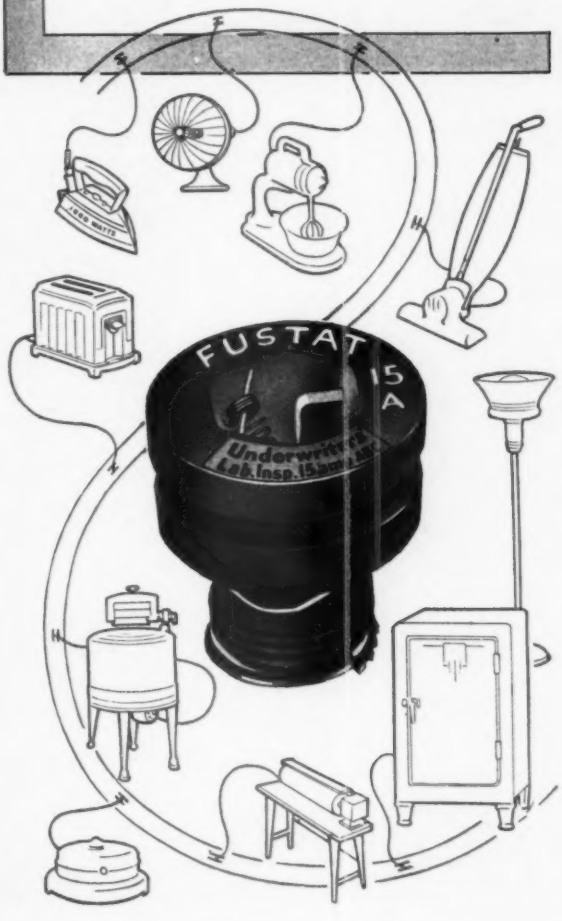
FLEXIBLE FEEDERS — These two flexible four wire feeders maintain electric service while the building next door travels 80 feet.



POWER WHILE MOVING—With transformers above, this temporary switchboard in an adjoining building provides power for a warehouse that is being moved.

YOU CAN ADD MORE APPLIANCES TO PRESENT CIRCUITS ... *and do it Safely ...*

with the FUSTAT



Doesn't blow needlessly

You can load an ordinary circuit *right up to* capacity and yet protect it with a 15 ampere Fustat. Its long time-lag keeps it from opening needlessly.

The Fustat offers a way to expand the use of present facilities—with perfect safety—and with the elimination of needless blowing of fuses. But—

Positively stops user from overloading the circuit

The Fustat cannot be replaced with a penny or other substitute for the fuse — or with a size too large to protect. In fact, side-tracking protection in any way is practically impossible without destroying the Fustat or adapter and thereby clearly showing the user that his protection is gone.

If additional circuit capacity is needed, users cannot readily side-step the issue — at the sacrifice of safety.

Destruction of circuit wiring is prevented — fire hazards are reduced — costly shutdowns and expensive repairs are avoided.

Prevents hazardous burnouts of flexible cords

The Fustat contains a fuse. The ability of a fuse to protect against dangerous cord shorts, grounded sockets, etc., is well known.

Protective devices that do not open quickly enough when dangerous cord shorts occur, permit the cord to burn out at the short. You get the fireworks in your face, or hands, or elsewhere around the house where they may cause damage or start a fire.

The quick action of the Fustat on such dangerous "household" shorts prevents spraying of molten metal, starting of fires, burning of users.

Answers today's demand for trouble-free circuit protection

For what other device than the Fustat can permit circuits to be loaded to full capacity — yet prevent dangerous overloading . . . make safe protection remain safe . . . protect against dangerous cord shorts . . . and eliminate needless blows and service interruptions?

Using Fustats for circuit protection — is just good business

The Fustat fits present fuseholders

Thru the use of an inexpensive adapter, the Fustat fits any standard Edison base fuseholder. The adapter screws in like a fuse and locks in place. The Fustat may be changed in the regular manner.

On new jobs, when buying panels, switches, etc., you can specify that they be equipped with Fustat bases.

The FUSTAT

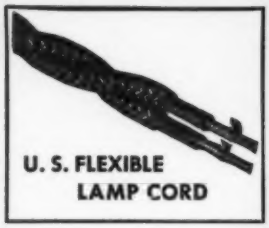
Retails at 7½¢ in 15 to 30 amp. sizes

Write for full information to any of the undersigned

BUSSMANN MFG. CO.	KIRKMAN ENG. CORP.	NATIONAL ELEC. PDTS. CORP.	UNION INSULATING CO.
University at Jefferson	131 Sixth Ave.	Fulton Bldg.	277 Broadway
St. Louis, Mo.	New York City	Pittsburgh, Pa.	New York City

A Wire Buyer

U.S. Rubber Offers a Complete Line of Electri res a
Industrial Application— Available Bran



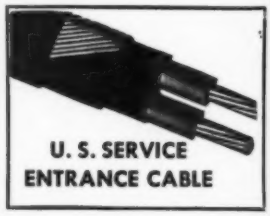
U. S. FLEXIBLE LAMP CORD

U. S. ROYAL PORTABLE CORD

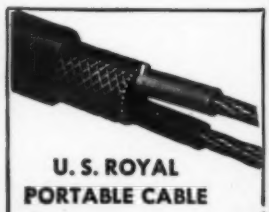
U. S. TELEPHONE WIRE

U. S. LEAD ENCASED BUILDING WIRE

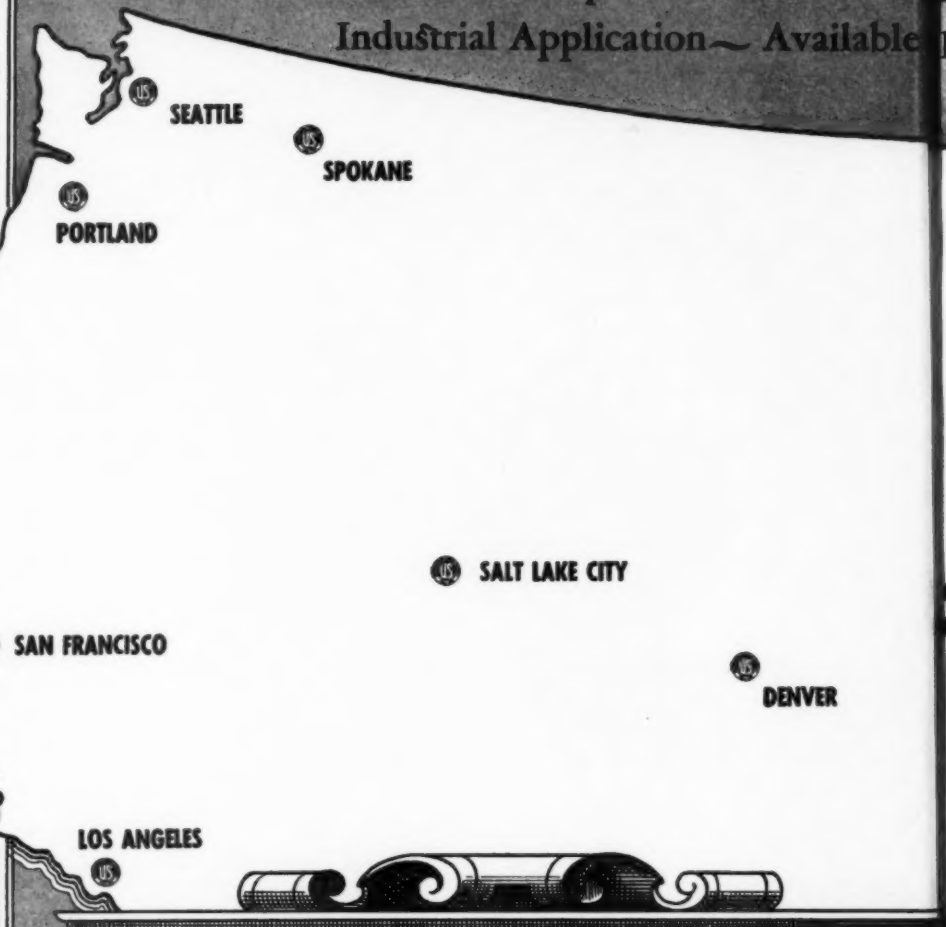
U. S. WEATHERPROOF WIRE



U. S. SERVICE ENTRANCE CABLE



U. S. ROYAL PORTABLE CABLE



FOR nearly fifty years U. S. Rubber's own great wire plant in Bristol, R. I., has manufactured electrical wires and cables. For more than ninety years U. S. Rubber and its constituent companies have pioneered in the research, development and manufacture of rubber products. The unparalleled uniform quality of U. S. Rubber Electrical Wires and Cables and the availability of *complete* stocks for every purpose is possible only because *all* the wire and *all* the insulation for *all* U. S. Rubber electrical conductors is built to *one* unvarying standard by *one* rubber company and distributed nationally through its own branch offices and warehouses, by recognized electrical wholesalers!

United States Rubber Company

United States Rubber Products, Inc., New York, N. Y.

MAP of THE U.S.

res and Cables for Every Domestic and
Branch Offices and Warehouses

MINNEAPOLIS
MILWAUKEE
CHICAGO
DETROIT
CLEVELAND
BUFFALO
SYRACUSE
BOSTON
NEW YORK
PHILADELPHIA
PITTSBURGH
BALTIMORE
INDIANAPOLIS
CINCINNATI
KANSAS CITY
ST. LOUIS
TULSA
ATLANTA
BIRMINGHAM
DALLAS
NEW ORLEANS

U. S. ZIPCORD

U. S. ROYAL WELDING CABLE

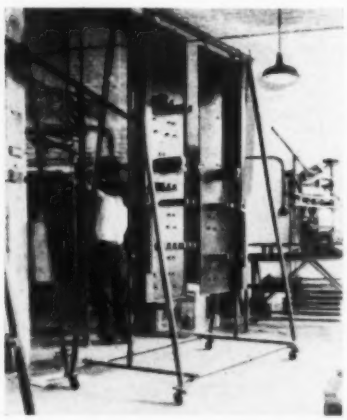
LCX CONCENTRIC CIRCUIT WIRE
(Laytex Insulation)

U. S. SAFECOTE BUILDING WIRE

Motor Shops

PANEL MAKEUP SUPPORT

Complex switchboard and relay panels for substations are handled on portable hangers at the Clement Industrial Electric Co. Grand Rapids, Mich. The



***PORTABLE PANEL SUPPORTS —** Holds steel relay panels in convenient position for mounting equipment and wiring.*

panels consist of double steel doors designed to mount on cubicles. They are suspended from the top rail of the hanger with S hooks and held in position on the side rails by the permanent hinges.

The A frame supports are rigidly constructed of 1½ inch pipe welded to the top and bottom rails and braced with channel iron. Ball bearing casters allow the job to be moved about readily.

COILS BURNED ELECTRICALLY

Charring the coil insulation by heavy currents prepares stators for stripping at the Boustead Electric and Manufacturing Company of Minneapolis, Minn. Backed by large fuses, the coils are connected and allowed to heat until the insulation bursts into flame. After cutting, the coils may be removed easily. This method prevents damage to the slots and frame from strain, during the pulling operation.

ANY-ANGLE ARMATURE SWIVEL

Small armatures are held in a convenient stand at the Schultz & Ingram, Inc., motor service shop of New Haven, Conn. The holder is adjustable for varying shaft lengths and may be revolved in a horizontal plane to any desirable working position.

A 1¼-in. flange, nipple and tee form the bench support. A key which extends for the full length of the 1¼-in. pipe rail, slides in a keyway cut in the base or supporting tee to prevent the stand from turning. Two automobile engine con-

***ANY POSITION**—Swivel stand for small armatures holds shaft under spring tension.*

necting rods form the uprights. They have a slot for the sliderail key in the lower bearing. Pins in the upper bearings of the connecting rods press into the lathe centers of the shaft to hold the armature under spring tension.

MOBILE "JAZZ" WELDING

Industrial contracting jobs and motor shop work provide an increasing demand for a handy portable welding outfit, according to E. H. Kotz of the Electrical Motor Repair Company of Trenton, N. J. With special iron supports and brackets to be made up for various motor and control mountings, and for conduit racks and the like, an outfit is needed that can be easily moved around in a plant or at the shop. Moreover, it should operate on easily obtainable current supply.

Here Mr. Kotz himself is striking an arc on a bar-iron motor bracket that was welded together for setting a blower drive beside a ventilating duct. The outfit being used is a No. 125 Packard auto-transformer type welder, which operates an a.c. at 40 amp., 110 v., or

***MOBILE WELDING**—Light-weight a.c. welder on wheels found useful for many industrial jobs.*

20 amp., 220 v. The secondary output is from six to twelve volts and up to about 125 amp. The barrel-shaped unit is mounted on two wheels and has a handle for rolling it around on the job. Since using this outfit so successfully on various jobs, Mr. Kotz has put in a stock and is selling these welders to his industrial customers.

REPLACEMENT STATORS

Growing demands for emergency rewinds taxed shop facilities, so Spaulding Electric Company of Detroit, stocked a line of standard three phase stators ranging from 1 hp to 15 hp and 1800, 1200 and 900 r.p.m.

Get the Best Mercury Lamp Illumination Efficiencies with Time-Proven Transformers

●Mercury lamps, to give trouble-free, dependable performance require an accurately designed transformer to govern the current and supply the correct starting and operating voltages.

Jefferson Mercury Lamp Transformers insure continuous satisfactory operation because of their liberal design and careful construction.

Besides, they have these definite advantages and features:

- Cool
- Quiet
- Efficient
- Neat and compact
- Roomy wiring compartments
- Facilities for mounting in any position
- Combination wall mounting and fixture suspension unit
- Provided with clamps for messenger wire support.

Jefferson Mercury Lamp Transformers are fully described in new Bulletin 371-ML. JEFFERSON ELECTRIC COMPANY, Bellwood (Suburb of Chicago), Illinois. Canadian Factory, 535 College Street, Toronto.

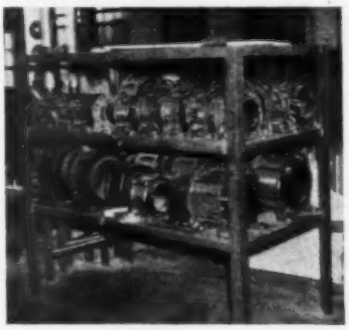
Write for New Bulletin 371-ML.

JEFFERSON
Mercury Lamp
TRANSFORMERS

Motor Shops

[FROM PAGE 32]

Where quick service is essential the burned out motor is dismantled, a new stator installed and the job reassembled

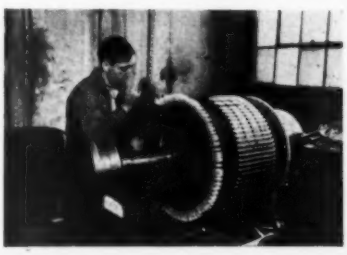


STATOR STOCK *facilitates handling rush repair jobs without overtime schedules. The customer is charged the regular rewind prices and his stator rewound for stock.*

ready for the customer. The old stator is then carefully rewound on the regular schedule and placed in stock for the next job. By this method the shop is able to maintain high quality workmanship and still give quick service to the customer, without excessive overtime charges.

RISERS WEDGED FOR SOLDERING

To solder the coil connections of large rewound armatures satisfactorily requires careful make-ready work. In the Phoenix Electric Company shop at Youngstown, Ohio, a set of tapered maple wedges are tapped in place between risers to provide a compact and uniformly aligned mass of the many coil ends. After soldering is completed and all wedges are removed, the finished job presents a uniform appearance and the soldered coil connections are not under strain from misalignment. U-shaped pieces of sheet insulation are placed over each soldered riser before binding wire is applied.



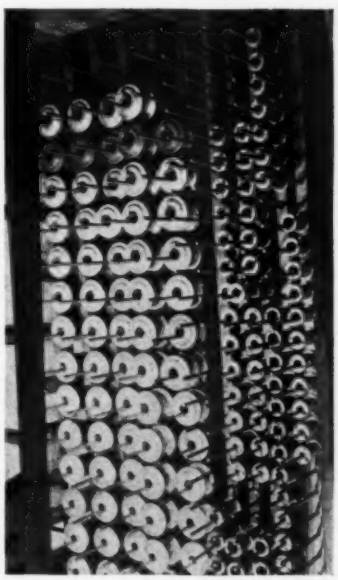
***BEFORE SOLDERING** — Maple wedges being tapped in place to facilitate coil alignment during the riser soldering operation.*

The armature in this photo has been equipped with a new set of coils, and wedges are already in place at the commutator end of coils. But the winder has not yet begun to drive home the other wedges until the complete set is in place. The maple wedges are 1¼-in. by 1½-in. by ⅞-in.

This armature is for a 200 h.p., 400/800 r.p.m., 6-pole, 230-v. d.c., type MPC General Electric Motor. This type motor is used by several customers of the Phoenix Electric Company under severe overload conditions often up to 200 per cent of rating.

TEXROPE BUSHING STOCK

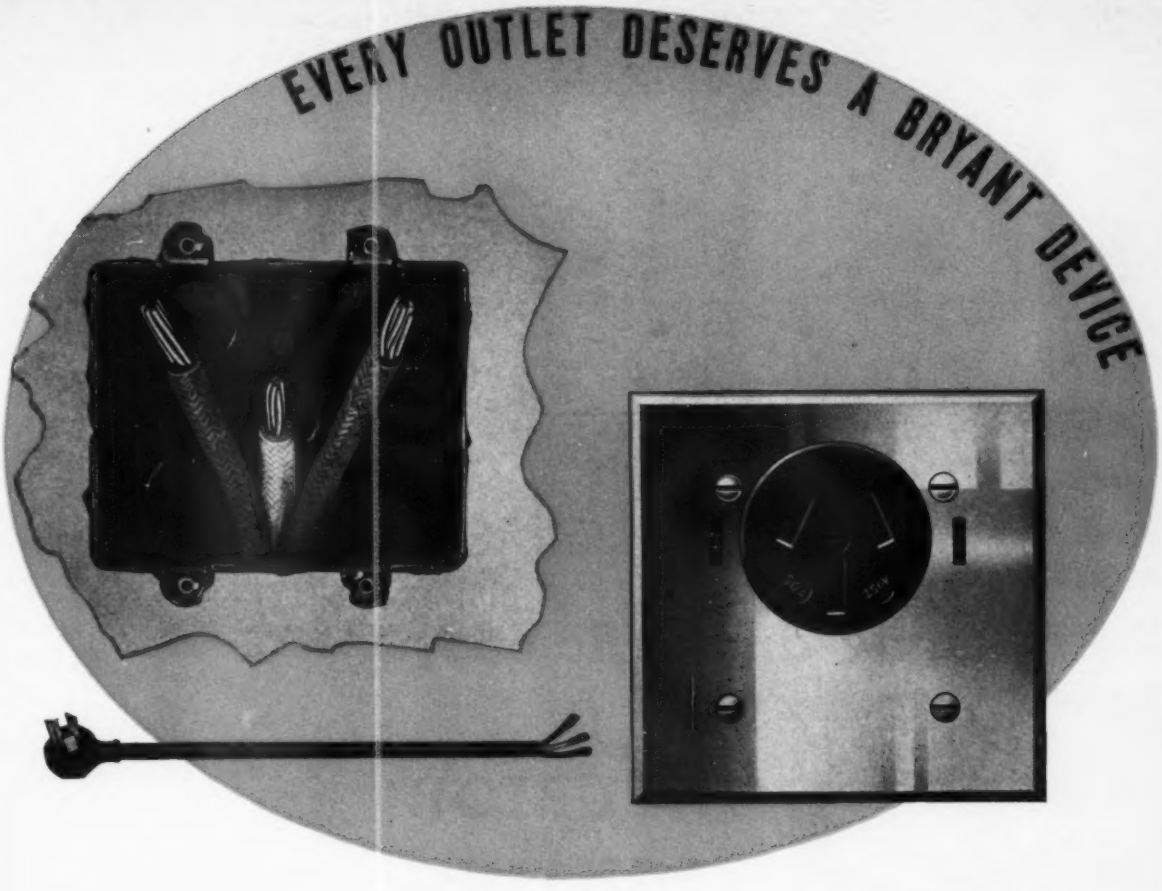
Stocking bushings in limited space is a real problem in the motor shop. The Scherer Electric Company of Indianapolis, solved it in an ingenious way. A framework of ten lengths of 2 x 4 were erected against the wall and drilled



PULLEY RACK—*a compact and readily accessible method of stocking Texrope bushings.*

edgewise for ⅜ rod. The rods extend 12 inches beyond the edge of the 2 x 4 uprights.

As the photograph shows, several hundred Texrope bushings may be stocked on this rack. The projecting pins allow the pulleys to be arranged and grouped according to size and shaft diameter. Any pulley is readily accessible.



A BETTER CONNECTION FOR BETTER COOKING

Today there are five electric range installations to every one a few years ago. This growing market means more range connection business for you.

Therefore, electric range service is necessary in every modern home, and is assured by a modern connecting means. Bryant has a complete line for this purpose.

Bryant range receptacles and cord sets provide safe, trouble-free connections that are a credit to your workmanship and a vital part of this modern type of cooking.

BRYANT
WIRING DEVICES

Sold Through Electrical Wholesalers

THE BRYANT ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT
NEW YORK 100 East 42nd St. · CHICAGO 844 West Adams St. · SAN FRANCISCO 325 Ninth St.

Electrostatic Air Conditioning

[FROM PAGE 20]

The main advantage of the electrical precipitation method of air cleaning is in its ability to handle extremely minute particles. It is possible to clean air with almost any desired efficiency although about 95 per cent based upon particle count is considered the practical limit. This compares with 19 per cent for the mechanical type filter. At the same time the electrical method offers very little resistance to the air flow.

Low Consumption

Current consumption of a 30,000 CFM unit is less than 500 watts. Due to the low resistance pressure, less than 1/10 of an inch of water, the current consumption is partially offset by lower fan power required to force the air through the ventilating system. The cost of the installation is in the order of 30 cents per cubic foot capacity or about 4 times the cost of mechanical filter.

The assembled cells and rectifying equipment are shipped ready made from the factory. The field work consists of setting up the necessary angle iron framework and making the wiring connections.

Besides ventilating systems in office buildings and homes, the Westinghouse "Precipitron" may be used in industrial processes and commercial establishments for other uses. One installation in a central switching room of an automatic telephone exchange reduces service interruptions due to dust, an important maintenance problem where there are thousands of delicate relays. Another installation at the Homer Laughlin China Plant in Newell, West Virginia, recovers expensive glaze from spraying machines.

A New Market

The market possibilities of electrical dust precipitation opens up a new field for the electrical contractor. Research indicates that air cleaning for dust elimination and the relief of alergic ailments such as hay fever and asthma offer the largest present market. But the recovery of fine dust in industrial processes often heretofore considered impractical, will bring many new applications.

With the outlook for industrial modernization on the upgrade, here is a field in which electrical contractors will need to study the processes of their industrial customers. Electrostatic precipitation of dusts is a new sales opportunity.

ELECTRICAL

Maintenance

INDUSTRIAL AND COMMERCIAL

GUIDE SHEETS FOR YOU

—An Announcement

***MORE THAN THAT**—Modern Maintenance is more than a fix-it job. It calls for knowledge and planning and selling. All these are vital to good management and progress.*

BEGINNING next month, Electrical Contracting will present in this department a "Check-up of Maintenance Practice". This discussion will cover the scope of the maintenance man's job and the equipment involved in modern maintenance—types, applications and maintenance requirements.

One of the first big electric signs in the west was in Denver. It read "THE WORLD MOVES—SO DOES TURNER". There ought to be another one today in every factory town reading—"INDUSTRY MOVES—SO DOES MAINTENANCE."

No modern maintenance man can sit back long in his job in these times. If he does he soon finds himself way behind the fast changing electrical progress.

How does an electrical maintenance man keep up with his work under these conditions?

In two ways—*first*, he must *understand* this job of modern maintenance; second, he must study the changes that are continually taking place. For the man engaged in maintenance—be he plant electrician or electrical contractor—can not watch all the latest books and engineering literature and still have time enough left to do his never ceasing job.

THE ELECTRICAL MAINTENANCE MAN'S JOB—

What Is It?

MAINTENANCE men have not one job but really five—in the modern factory or other big building. They have five jobs to understand and do. These are—

1. Selection and application of equipment.
2. Operation of electrical system.
3. Inspection and testing of apparatus and system.
4. Electrical construction for modernization and expansion.
5. Control of operating and maintenance costs.

Each one of these jobs is important. No one of them can be neglected without affecting the other. All must be kept in balance. No one can get behind.

So the man in charge of maintenance today must be more than a mechanic, more than an electrical man. He must be a business man and a good manager —or he will do a poor job of maintenance. Therefore, his work and his personal opportunity depends upon his ability to organize his job. And this applies as much to the contractor, who does maintenance under contract, as to the head of a plant electrical department.

Here is the maintenance responsibility, as it is carried today, by men who have made this function recognized by the management. It is worth a brief review.

Selection and Application

When the management thinks about buying new equipment, relocating old equipment, adding to the plant, or building a new plant, the electrical maintenance man is called in for suggestions and recommendations. He must be ready with full knowledge.

He is expected to have constructive ideas on anything that has to do with the electrical system.

Of course, every plant has its own operating problems which affect the electrical requirements. For certain jobs, plants in one industry may use electrical equipment of standard make and construction. In another industry, provisions might have to be made for protection against dust. In still another, equipment might have to stand up in atmospheres with considerable moisture or harmful fumes.

Thus one of the electrical maintenance man's most important responsibilities is to keep up to date electrically. He must be able to make money-saving recommendations about equipment and materials, and see to it that full advantage is taken of the latest safety features. This is responsibility No. 1, on the job.

Keeping the Plant Going

After electrical equipment is selected and installed, it must continue to work properly. As far as the electrical end is concerned, it is the maintenance man's duty to see that production can be maintained according to schedule or increased as planned.

If equipment is used in service for which it was designed, it should require very little special attention during its normal life. However, it will need servicing, because certain parts will naturally wear or become damaged. Therefore, arrangements should be made for inspection at regular intervals.

Obviously, some equipment should be inspected more often than others and it will depend largely on the frequency of operation.

Good practice dictates that a thorough inspection of all equipment be made at least once every six months.

Minor adjustments or regulations can usually be made at the time of regular inspection. If replacements, renewals, or other important changes are required, they should be noted, preferably on an inspection card, and the employee making routine inspection should see that they are brought to the attention of his boss.

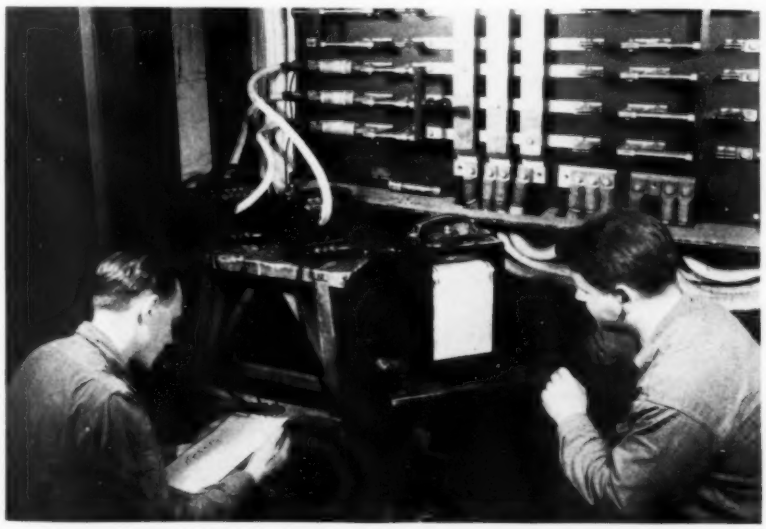
The maintenance man must see not only that all this work is well organized and done on schedule. He must make sure that his inspection does not stop short of complete responsibility for preventing trouble and loss in production.

Periodic Tests

In addition to the regular inspection, of course, periodic tests of electrical equipment should be made for load, efficiency, insulation resistance, and the like, and readings recorded. Such tests will warn of danger ahead, where a machine may be in use on an operation for which it was not originally intended. Or it may be under abuse by an untrained operator. Or some other harmful condition may exist without the maintenance man's knowledge.

"Paper Work"

Naturally to make intelligent use of tests and to control the operation of the electrical system requires considerable paper work. Records must be kept. But more than that—*records must be analyzed.* For records are only good for what they tell you—*for what the figures mean!* And only from such records can a maintenance man present facts to the management and show that



"READ"—"CHECK"—*A lot of work is done in modern maintenance that needs good engineering brains—since prevention beats repairs.*

TYPICAL INSPECTION RESPONSIBILITIES
of the Electrical Maintenance Department

Rotating Apparatus

Cleanliness
Airgap
Float or play of rotor
Lubricant in bearings
Oil rings in place and turning
Wear and fit of brushes
Tension of brush holder springs
Loose brush holders and studs
Distance of brush holders from commutator
Wear of commutator and slip rings
Vibration
Mounting bolts
Coupling or gears
Tension of belt or chain
Safety guards in place
Ventilation
Insulation resistance
Loose connections
Ground connections

Control

Cleanliness
Contact tips clean and compararively smooth
Armatures move freely
Tension of contact springs
Contactor coils held firmly
Heating of contactor coils
Atmospheric conditions
Ventilation
Fuses
Loose connections
Alignment of switch blades and blade contacts
Handles fastened and move freely
Broken resistors
Covers on and will remain closed
Cotter pins in place and held in
Mounting screws and bolts
Oil in compensator and circuit breakers
Terminals marked
Ground connections

Miscellaneous

Lamps and reflectors clean
Lamps and fixtures fastened
Vapor-proof or other enclosed lamps
Distribution panel doors close and lock
Distribution panel ledge clear
Conduit fastened and grounded
Conduit exterior cleared of all articles
Convenience outlets in condition
Extension cords in serviceable condition
Temporary lines replaced or made permanent
Limit controls—travel, speed, temperature, pressure
Instruments—permanent or testing
Signalling devices
Safety signs and exit lights
Fan motor and lamp enclosures in spray booth
Screens or enclosure for welding
Electric trucks and lifts
Fans—ceiling, wall, portable

Maintenance problems like those above divide themselves under definite topics. The following schedule of articles will discuss them here in insuing issues.

Data to be Presented in the Coming
"GUIDE SHEETS" ON MAINTENANCE PRACTICE

1—The Scope of Electrical Maintenance Men's Duties

2—Alternating Current Motors
Types and Applications

3—Direct Current Motors
Types and Applications

4—Alternating Current Motors
Maintenance

5—Direct Current Motors
Maintenance

6—A.C. Motor Starters and Controllers
Types, Applications and Maintenance

7—D.C. Motor Starters and Controllers
Types, Applications and Maintenance

8—Special Control Problems
Heavy Installation and Maintenance

9—Electric Distribution
Wiring and Circuit Protection
Power Factor Correction

10—Illumination
General and Local: Types and Application
Flood lighting: Application and Maintenance

11—Electric Heat
Small Heating Problems: Types and Applications
Large Heating Problems: Ovens and Furnaces: Types, Applications and Maintenance

12—Electric Welding
Types, Applications and Control

13—Interplant Communication
Types and Common Maintenance Problems

14—Instruments
Types, Application and Care of

15—Power Tools and Appliances
Types, Application and Care of

16—Batteries, Rectifiers and Chargers
Types and Special Maintenance Problems

17—Electroplating
Electrical Maintenance Aspects

18—Electronic Devices
Types and Applications

he knows his business. And only then can he expect his advice to be followed.

One set of records should cover the types, characteristics, and operating conditions of all equipment, classified by kind or by department. A convenient way to do this is to keep a card system. Each device or piece of apparatus should be listed on a separate card.

Another record usually required is the system layout, the circuits for power distribution. This record can be a set of drawings or blueprints showing location of the main feeders and branch circuits throughout the plant.

Other records should include wiring diagrams and changes of connections, construction details for special mountings, information on new equipment, and of course the records of tests that show system performance. The number and amount of records to be kept will be governed by the size of the plant and the policy of the organization.

The electrical department must also be able to furnish a record of power used for the entire plant and by departments. This is figured from meter readings taken at regular intervals.

This is vital information for the management. For power economy is a definite measure of electrical maintenance efficiency.

Repair and Expansion

Out of tests come the need for repairs and alteration. Out of changes in production processes come demands for wiring to new or relocated electrical equipment. The man in charge, of course, must have a basic knowledge of electrical construction. That goes without saying. But that means more than just knowing how to connect wires. For equipment is constantly changing. More complicated uses of electrical control, power, heating, welding and air conditioning equipment keep coming along and must be understood.

Advice must be given too on future power requirements and electrical system expansion, and how plant wiring and other electrical equipment will affect alterations or changes in production. The maintenance chief must be acquainted with the condition of the entire electrical system, and in position to determine if more load can be added, or other electrical changes made.

To do all this, he must be thoroughly familiar with the codes in effect in his locality. For installations or equipment, which appear to be perfectly serviceable, might turn out to be a violation of some code requirement.

Emergencies

And now for the all-important ability to meet emergencies. The maintenance man may have the electrical system functioning in the best possible order, but there are bound to be times when things happen that are beyond his control. It may be sudden breakdowns, fires, explosions, floods or strikes.

For such emergencies, all possible preparation should be made. Ample renewal parts and stock equipment should be carried. All safety precautions should be rigidly observed. And the matter of safety cannot be over-emphasized.

The electrical maintenance man is directly responsible for the employees working under him, and indirectly for the others in the plant. It is one of his duties to see that necessary precautions are taken to prevent accidents to employees and equipment. Workmen must be instructed in operating electrical equipment safely and economically.

To this end the instructions should be posted in a conspicuous place. But that is not enough. He must see that all employees concerned *understand* the hazards and observe the rules.

Seven Functions

This, then, is what is expected of the competent electrical maintenance man—

1. Sound advice on selection and application.
2. Systematic inspection and tests to keep the equipment in working order.
3. Knowledge of construction and codes.
4. Recommendations regarding plant expansion.
5. Ability to keep and analyze orderly records on equipment and power costs.
6. Adequate preparation for emergencies.
7. Constant regard for safety and economy.

That's no small job.

MOTOR RECORD

H.P. _____ R.P.M. _____ MFR. _____ TYPE _____ SERIAL NO. _____
VOLTS _____ PHASE _____ FRAME _____ FORM _____ MODEL _____
F.L. AMPS. _____ CYCLES _____ TEMP. RATING _____ CONSTRUCTION _____
BEARINGS, CAT. NO., PULLEY-END _____ FRONT END _____
BRUSHES CAT. NO. _____ QUANTITY _____ SIZE _____ MATERIAL _____ GRADE _____
STATOR OR FIELD COILS, NUMBER AND CAT. OR SPEC. NO. OF-
MAIN _____ COMP. _____ COMM. _____
ROTOR OR ARMATURE COILS, CAT. OR SPEC. NO. OF-
COILS _____ BARS _____ NO. PER SET _____
DRIVE-MOUNTED ON SHAFT-COUPLING-PULLEY-GEAR-CHAIN-VERTICAL
DATA-
PURCHASE ORDER _____ DATE _____ COST _____
SELLER _____ LOCATION _____

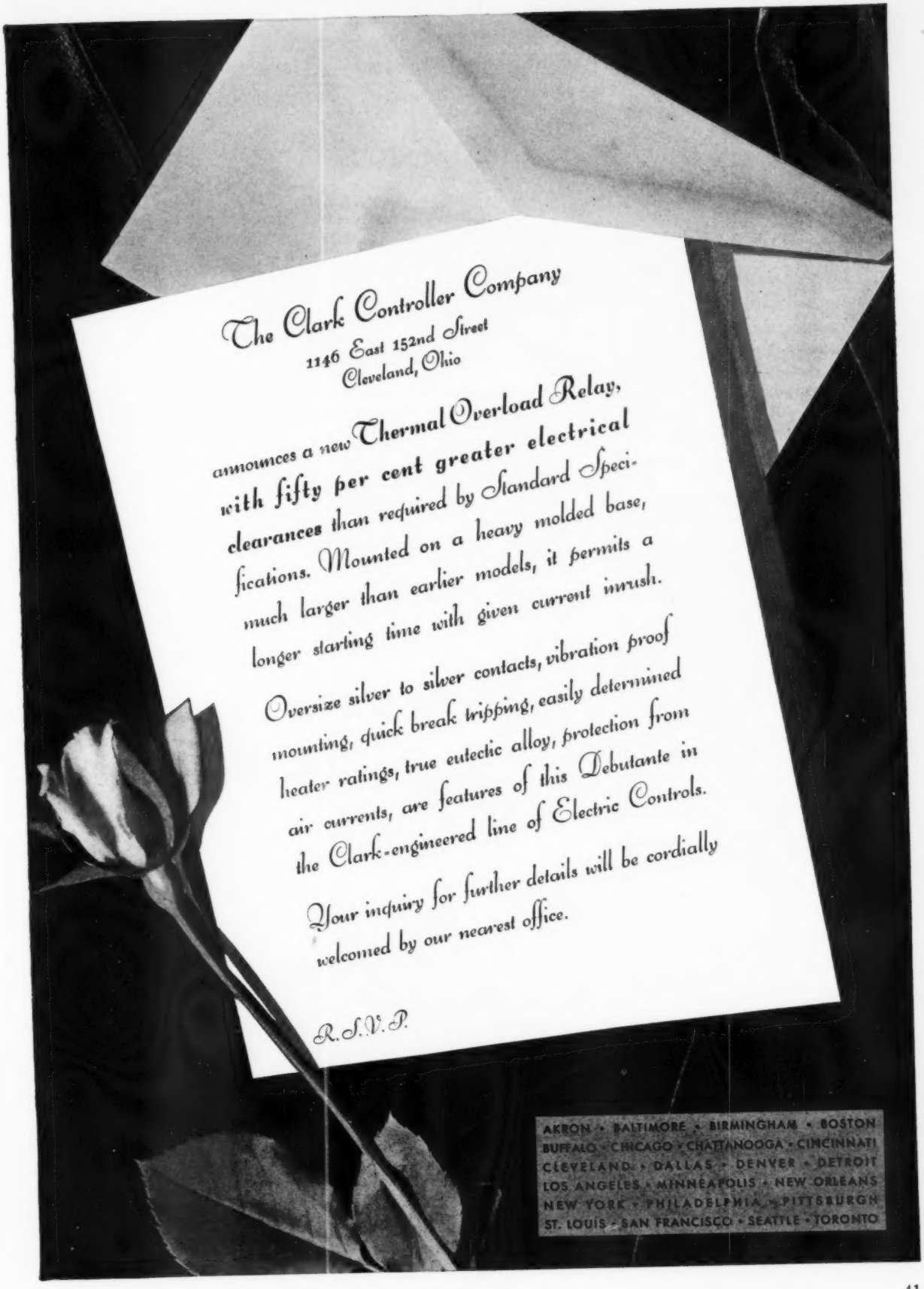
CONTROL EQUIPMENT

TYPE _____ MFR. _____
CAT. NO. _____ CONNECTION DIAGRAM _____
AUXILIARIES _____
PURCHASE ORDER _____ DATE _____ COST _____
SELLER _____ LOCATION _____
REMARKS _____

***SUGGESTED MOTOR RECORD CARD**—This form properly filled in for each motor in the plant, gives rating, data for renewal parts, drive, control, inventory, as well as a record of service, repairs and inspection—a "case history" of each motor. (Original card 5 x 8 in. Lower illustration shows reverse side.)*

SERVICE				INSPECTION	
DATE INST.	LOCATION	DATE OUT	REASON	DATE	REMARKS

REPAIR			
DATE	NATURE	REPAIRED BY	COST


The Clark Controller Company
1146 East 152nd Street
Cleveland, Ohio
announces a new Thermal Overload Relay,
with fifty per cent greater electrical
clearances than required by Standard Specifications. Mounted on a heavy molded base,
much larger than earlier models, it permits a
longer starting time with given current inrush.
Oversize silver to silver contacts, vibration proof
mounting, quick break tripping, easily determined
heater ratings, true eutectic alloy, protection from
air currents, are features of this Debutante in
the Clark-engineered line of Electric Controls.
Your inquiry for further details will be cordially
welcomed by our nearest office.
R.S.V.P.
AKRON • BALTIMORE • BIRMINGHAM • BOSTON
BUFFALO • CHICAGO • CHATTANOOGA • CINCINNATI
CLEVELAND • DALLAS • DENVER • DETROIT
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS
NEW YORK • PHILADELPHIA • PITTSBURGH
ST. LOUIS • SAN FRANCISCO • SEATTLE • TORONTO

Trouble on Silent Paging Systems

Silent paging systems are usually combinations of lamp annunciators and transmitting keyboards and control units. Occasionally buzzers or chimes are provided to transmit a momentary audible signal in times of emergency.

The following suggestions point out what to do when trouble comes on the three-call multiple flashing, the single-call flashing and non-flashing, the individual-call, and the multiple-letter and numeral type systems.

When all lamps in annunciators and pilots fail to light.

1—Check for blown fuses and open main switch in 110 volt systems. Check for blown fuses, open main system switch, and defective transformers in low-tension systems.

2—Examine for loose or broken common wires leading to keyboard, or to coils of relays, also to flasher.

When entire group of lamps fail to light on certain figures.

1—Examine for defective contacts on relay controlling that particular group. Check control key or control switch for broken springs or defective contacts.

2—Examine for defective contacts on multiple circuit type motordriven flasher.

3—Check for loose or broken sections of wire leading from control unit or keyboard to the annunciatores.

When only certain lamps fail to light.

1—Examine for burned-out or defective lamps.

2—Examine for defective lamp receptacles.

3—Check for loose wires leading to lamp receptacles affected. Also, examine common wire in annunciator leading to the respective lamp receptacle.

When entire group of lamps fail to extinguish.

1—Check for defective control key or switch which controls group. Examine springs and contacts to see that they open circuit after these controls are operated.

2—Check for short-circuit in wiring at terminals near corresponding control key or switch. Also check for grounds.

3—Examine relay controlling group for "frozen" armature and contacts that are "stuck".

4—Examine flasher contacts controlling group.

When only a certain lamp in annunciator fails to extinguish.

1—Check for crossed or grounded wire in annunciator affected.

When audible signals fail to operate.

1—Check audible signal and adjust.

MIKE'S MAINTENANCE MANUAL

By J. M. Zimmerman
Service Division.
Westinghouse Electric & Manufacturing Company, Chicago, Ill.

"Well Chosen Spares Will Prevent Nightmares"

COSTLY production shutdowns have resulted from the lack of well chosen spare equipment and parts for electrical equipment. These shutdowns cost many times more than adequate spare insurance.

All spares, either parts or equipment, should have a definite depreciation schedule. A suggested average is to charge one-seventh of their total cost to maintenance each year, even though they have not been used. If the equipment becomes obsolete faster, then this period should be shortened. This yearly charge to maintenance is a periodical reminder to the operating department to choose spares wisely.

The system of carrying spares in a capital account and charging them out only when they are used, generally sours the management on adequate protection. They have to write off a great deal of obsolete equipment parts which are of no value because of equipment obsolescence. This remote day of "paying the fiddler" often makes a later generation of the operating organization pay for the unwise investment of the previous one.

Make a careful study of your production equipment with the view of determining how long any machine can be down without a loss in production, and then determine the cost of adequate spares to prevent this shutdown. By comparing these two figures it becomes an easy problem to determine which is more economical.

LIGHT CONDITIONING *with* RLM REFLECTORS *insures* MORE LIGHT AT NO EXTRA COST

MORE LIGHT at no extra cost is one of the four essentials of proper LIGHT CONDITIONING insured by specification of RLM Labeled Lighting Reflectors. RLM Labeled Reflectors assure the maximum of efficient light for every dollar expended for electric current. Because every lighting reflector so labeled meets the high reflection and output specifications established by the RLM Standards Institute. Nine manufacturers now make RLM Dome, RLM Deep Bowl and RLM Symmetrical Angle Lighting Reflectors which meet these specifications and the other three essentials of proper LIGHT CONDITIONING which are:

1 BALANCED LIGHTING. Even distribution and adequate diffusion are just as important as the quantity of light to proper LIGHT CONDITIONING. To meet the RLM standards for distribution and diffusion requires the use of the RLM specification reflecting surface of highest quality porcelain enamel, the ideal reflection material for Balanced Lighting.

2 LOW COST MAINTENANCE. RLM specification high quality porcelain enamel is the most durable of all reflecting surfaces. Being also the easiest to clean, maintenance costs are reduced to the minimum.

FREE BOOKLET
NOW READY FOR YOU

Invaluable to everyone who specifies, purchases or sells industrial lighting reflectors is the new RLM Book, "The Meaning of the RLM LABEL" just off the press. Tells the purposes of the RLM Label and details the RLM standards which assure maximum lighting performance. Write to the address below for your copy.

3 WARRANTY OF UNIFORM QUALITY. A rigid inspection and testing system conducted by the Electrical Testing Laboratories of New York, an independent testing organization, insures continuous conformance to RLM Standards by manufacturers of RLM Labeled Reflectors.

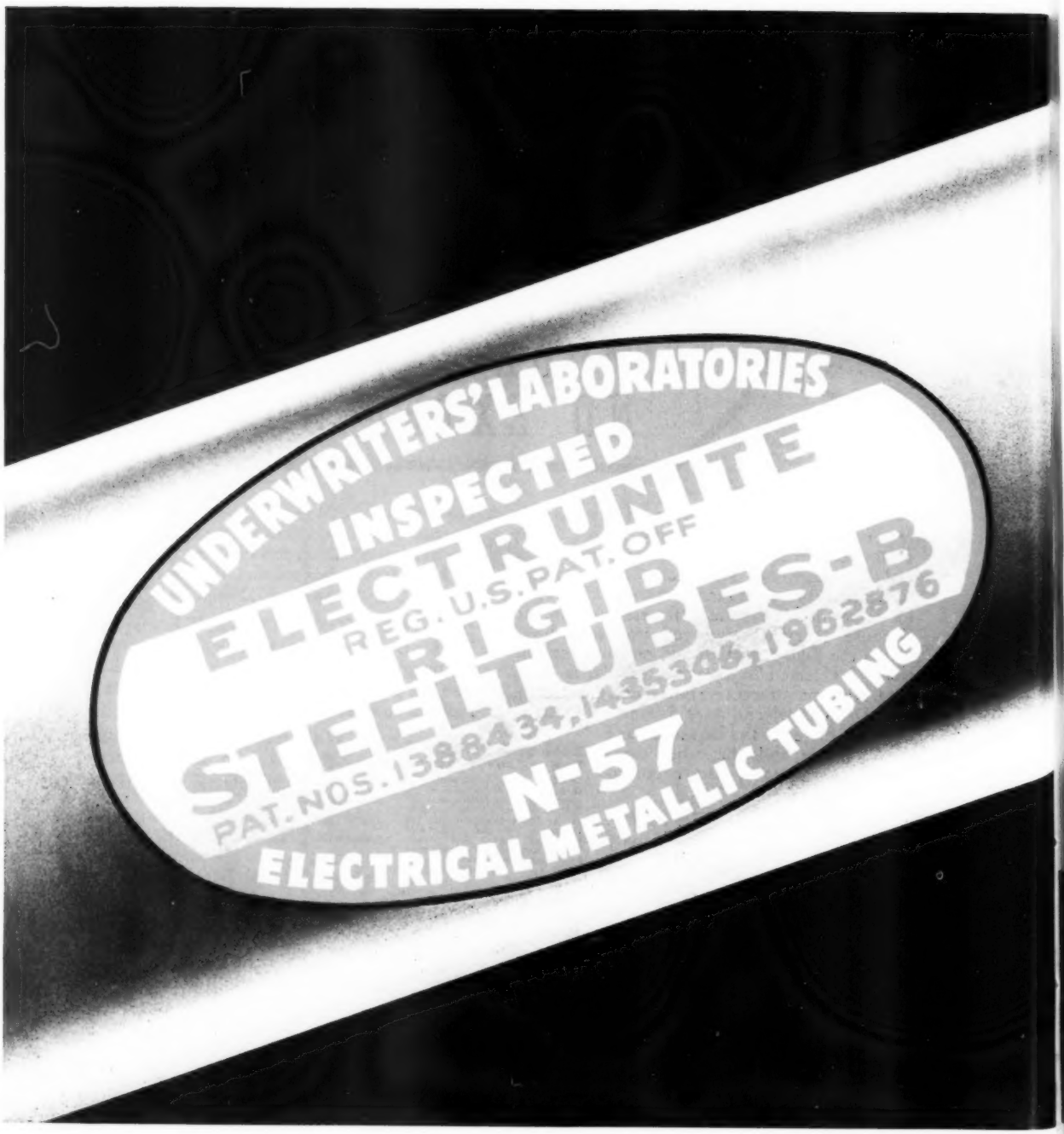
The letters RLM stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE
INCORPORATED

20 N. WACKER DRIVE • SUITE 1130 • CHICAGO, ILL.

THE CERTIFICATE OF RLM UNIFORM QUALITY

TO SPIKE


UNDERWRITERS' LABORATORIES
INSPECTED
ELECTRUNITE
REG. U.S. PAT. OFF
RIGID
STEELTUBES-B
PAT. NOS. 1388434, 1435306, 1962876
N-57
ELECTRICAL METALLIC TUBING

A RUMOR!

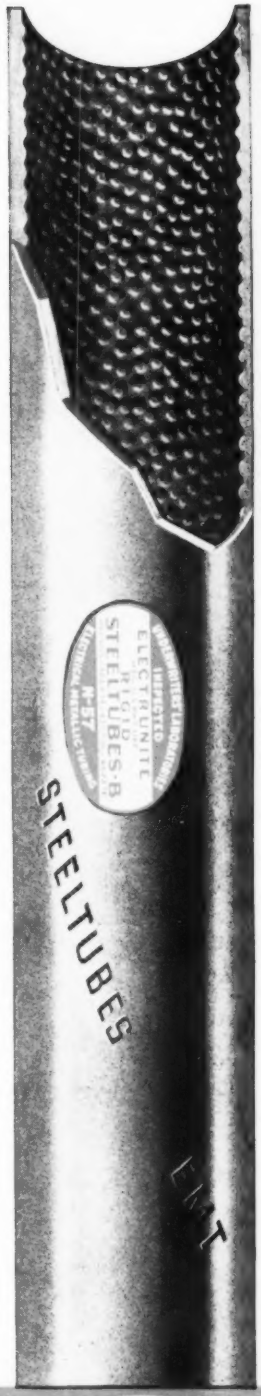
Many of our good customers have thought that Steel and Tubes, Inc., manufacture all the light wall conduit on the market. This is not true.

It is true we pioneered the idea, developed the product, constantly improved it, and generally promoted its acceptance in the field, but there are now many manufacturers producing electrical metallic tubing.

Take a minute to compare the difference — check the clean, white, smooth galvanized finish — look at the all but invisible electric weld — knurled, easy-pulling inside finish — compare the free, easy bending — hear the bell-like ring of the open-hearth, cold-rolled steel — check these differences with any other make on the market.

This label is the stamp of genuine ELECTRUNITE STEELTUBES — and remember it doesn't cost you an extra penny.

If it isn't good conduit — it isn't **ELECTRUNITE STEELTUBES.** *Ask for it by name.*



Knurled inside finish {Patent No. 1,962,876} available in ½", ¾", and 1" sizes.

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

ELECTRICAL DIVISION

Steel and Tubes, Inc.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND . . . . OHIO

2—Check for loose contacts or connections at audible signal and terminals leading from keyboard and control unit.
3—Examine ringing key or switch for broken spring or defective contact.
4—Check signal cam and contact at flasher.
5—Check signal relay coil, and contacts in control unit.

When audible signals fail to stop.
1—Check for defective ringing key or switch.
2—Check for short-circuit in wiring near control key or switch.
3—Examine flasher contacts controlling audible signals.
4—Examine relay controlling audible signals for "frozen" armature and contact springs that are "stuck".

MAINTENANCE ASPECTS OF CONTROL

How installation and maintenance problems have influenced motor control design

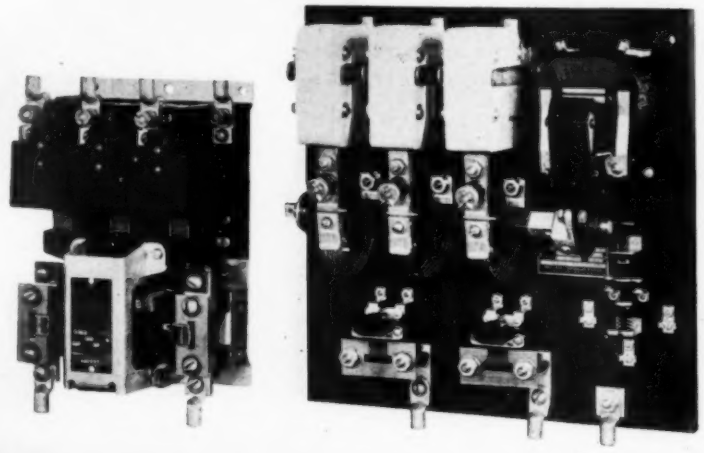
By F. H. ROBY *Industrial Controller Division*
Square D Company, Milwaukee, Wis.

Performance is usually the most important factor in the selection of new control devices, but most value is received only when enough thought is given to useful features in addition to performance. Maintenance problems should to a large extent influence the selection of motor control equipment.

One large automobile manufacturer, for instance, has made his maintenance department indirectly responsible for purchases. Before an order is signed, a maintenance engineer inspects the material to be bought and reports on installation problems and possible extent of maintenance. Designs are frequently changed to meet the approval of this department.

Many other industrial plants, large and small, have found some advantage in a similar division of responsibility for selection of electrical equipment. In some instances the safety department is added to the list of those whose opinion is sought, while others seek the advice of men who had similar installations in factories with similar problems. It is not uncommon to find information of this type freely exchanged between competitive concerns.

Inspection and criticism of this sort have had a marked effect upon the design of motor control. This has resulted in such improvements as: compactness without restricting accessibility for installation or maintenance, easy replacement of parts, space for inserting additional devices, and ability to func-



RATED ALIKE—*This comparison in size of two starters shows how demands for compactness were met in later designs.*

tion under severe conditions.

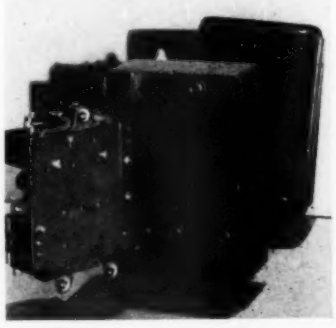
When electric motors were first used, mounting space for control equipment was unlimited and "duty cycles" were usually only a few operations per day. Now control is crowded into a cavity in the base of the machine or mounted immediately next to it. Space is valuable and performance cycles are complicated. Some controls must function for as many as one hundred reversals per minute, with heavy-duty starting and plugging service.

Compact

Where space is limited, users insist upon a compact design. This influence is largely responsible for the marked difference in two equivalent designs illustrated. In making control more compact, consideration was given to the fact that accessibility must not be sacrificed in favor of reduced dimensions.

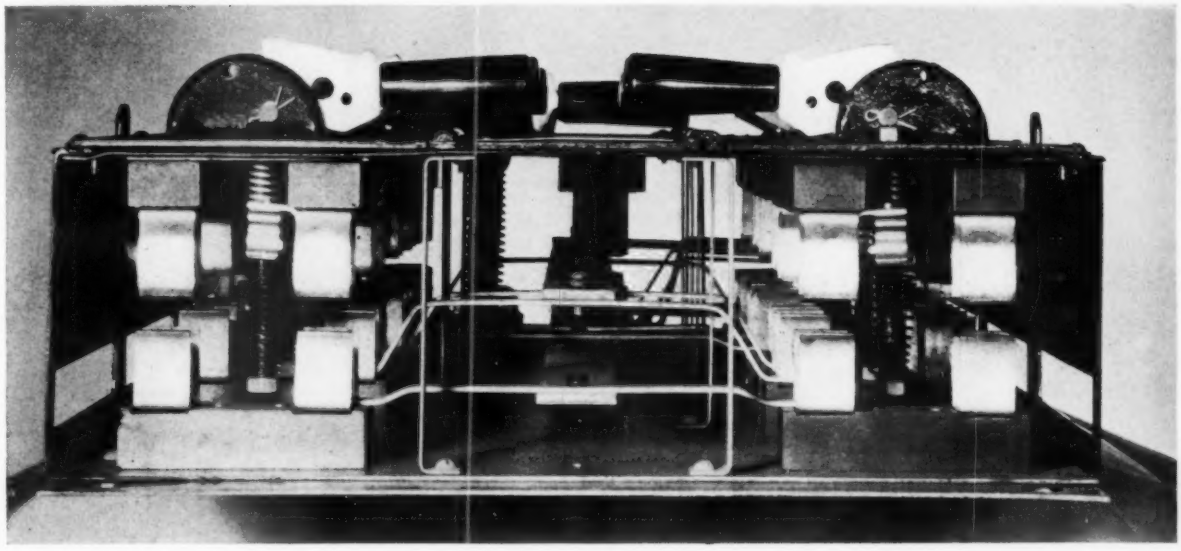
The design of automatic starting equipment has also been influenced by a trend toward individually driven, completely electrified machines. Contactors, relays, overload devices and timers are frequently assembled in the form of a completed unit for centralized control. At first, all of the separate devices were mounted, part by part, on an ebony asbestos panel and wired. This presented a neat appearance from the front but it was expensive and difficult to maintain. If one unit failed, the entire machine was out of service. Replacement parts to fit on the panel were difficult to obtain and the wiring had to be traced through the disorganized network on the rear of the panel. Now, individually insulated front connected devices are mounted on a sheet steel panel, to permit immediate inspection of wiring, and to allow entire units to be replaced with minimum delay. If necessary, machine builders or maintenance crews can reproduce the special equipment with a combination of standard devices obtainable on short notice.

Use of more or less standard items

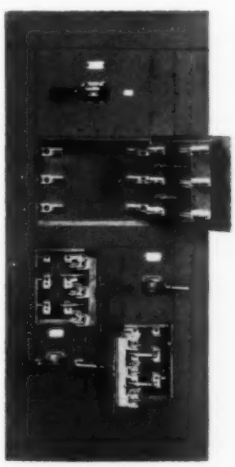


GETATABLE DESIGNS employ swing-out interiors for compact enclosures, to provide easy wiring and inspection.

PICTURE OF THE "Great Open Spaces"



that make CLEVELAND SWITCHBOARDS POPULAR WITH CONTRACTORS . . . and with Contractor Customers!



● In the first place . . . and this is probably the thing that will appeal to you *most* . . . the open-design of Cleveland Triple S Distributing Boards gives you plenty of room to *work* in . . . you can see what you are doing and there is room to do it. That makes every installation easier and quicker . . . and therefore that much more profitable. Too, from the standpoint of serviceability, this lack of partitioning and crowding guarantees better dissipation of heat from switch parts and fuses . . . permits easier inspection and less costly maintenance.

True, this makes Cleveland Switchboards just a little bit larger than the ordinary run, but when you consider the tremendous advantages this roomier designing makes possible for both *you* and your *customers,* you'll understand why the Cleveland Switchboard is fast becoming the *preferred* equipment of leading contractors. Send for our new specification manual . . . there's a type and size for every requirement.

Manufacturers of Safety Power and Lighting Panels, Knife Switches, Pull Boxes, Cutout Boxes, Cabinets and Switchboards.

THE CLEVELAND

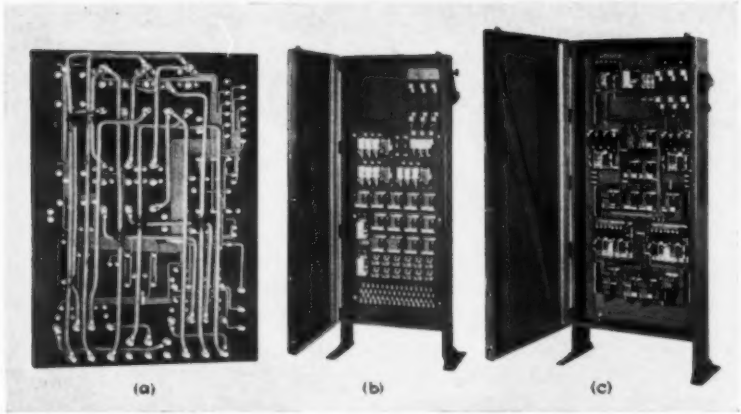
Switchboard

» » COMPANY « «

2927 EAST 79TH STREET • CLEVELAND, OHIO

Established in 1900—Member N.E.M.A.

Branch Offices at Chicago, Detroit, Indianapolis, Buffalo, Dayton, Pittsburgh, Philadelphia, New Orleans, Baltimore, Birmingham.



WIRING COMPLICATIONS *as rear view (a) shows were dispensed with for easier replacement and maintenance, when rear-connected controllers shown in (b) were re-designed for all-in-front makeup like in (c).*

of control for special applications has influenced details in contactor design. Engineering departments, maintenance crews, and contractors insist upon accessible terminals and provisions for mounting extra electrical and mechanical interlocks or overload relays. A device which can be modified on the job to meet special conditions has much to recommend it.

Accessible

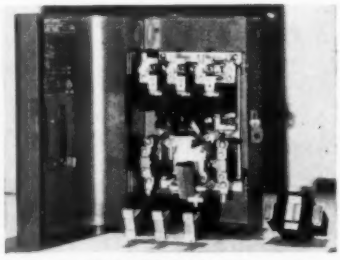
Although users have focused much of their attention on size and appearance, general installation problems and maintenance difficulties have not been overlooked. When enclosures were made smaller to meet installation requirements, swing-out interiors were devised to facilitate wiring and inspection. If control devices are crowded into inaccessible cavities in the machine base, a separable connector can be installed which makes it unnecessary to remove any wiring if the control panel is removed.

Individually driven, completely electrified machine tools involving heavy duty starting, frequent reversing, and plugging service have made necessary greater rupturing capacity and longer mechanical life. Instead of starting and stopping a single motor two or three times per day, various contactors, auxiliary relays and timers repeat a predetermined cycle as often as one hundred times per minute. Older types of industrial control, designed for a mechanical life of less than one million operations, would not survive such service. New devices must have a useful life of about five million operations. Some special applications, such as high-speed resistance welders, require specially developed control capable of even better performance.

Although splendid engineering is evident in most modern control designs, frequent replacement of certain parts may be necessary. Here again maintenance difficulties have been lessened by insisting that those parts be made accessible.

The motor-starter photograph illustrates how the stationary contact tips can be replaced without removing the wiring. Movable tips can be swung into the open for inspection and can be removed without tools. The magnet frame is easily removed to permit a change in the operating coil if a different voltage or frequency is required. Overload relays are out in front and can be exchanged by simply removing two screws. The time saved by these maintenance-aid features is readily apparent.

Other new developments which can be traced directly to the customer's initiative are: dust tight, water tight, and explosion proof enclosures. While some of these types have been developed in the interest of safety, the dust tight and water tight units are, without question, precautions against excessive maintenance under adverse service conditions. If control devices are mounted immediately next to the machines they control, their enclosures are the only protection against irregular atmospheric conditions.



EASY DISMANTLING *of replacement parts with simple tools saves delay and maintenance costs. Here designs meet demands of those maintaining severe-use control devices.*

Office-Heating Cost Cut by Electric Heat

In order to heat a shop office, a New England manufacturer had to overwarm an adjacent shop by forcing the steam system above the point of economical use. The office is at one end of the building. It has a main section 9 ft. by 12 ft., an ell 4 ft. by 12 ft., and a 7 ft. 8 in. ceiling.

A 5 kw. 220-volt electric air heater was installed in a basement storeroom under the floor of the office. It was located directly beneath a 10 in. by 12 in. register through which warm air discharges into the office. At a distance of approximately 7 ft. is a 9 in. by 12 in. register, which exhausts cool air to the basement. This provides a very satisfactory circulation.

FOR THOSE COOL DAYS*—Electric air heater, underneath register in floor, economically heats office.*

The office is provided with a steam radiator for the major heating requirements in cold weather. In the fall and spring, before it is necessary to start the steam system, electric heat suffices for the office, and in winter economically supplements the other heating.

A saving was made in labor which would be required if fuel-fired service was used at times during the fall and spring when the shop proper needs no heat. Furthermore, it has been estimated that if steam alone were used for heating the office, the cost of added fuel would be about double the amount paid for electric heat.

Ladders Do Skid

A ladder is one item of a maintenance man's equipment. It is good practice to fasten rubber, spikes, or other forms of non-slip feet on them. There will be less chance for an accident, not only to the user but also to other employees nearby.

How About It?

Questions and Answers

Q. *A 7½ hp. compound wound 825 r.p.m. 230 volt d.c. motor is giving trouble. The motor drives an embossing paper machine, through a variable-speed transmission unit so that the speed of the machine can be varied from 30 ft. to 25 ft. per minute. At about full speed the motor slows down and almost stops; however the 30 amp. fuse protecting the motor does not blow, and an ammeter connected in the circuit indicates that the motor has no overload. What defects should be looked for and how can they be remedied?*

A. Slowing down of the motor may be caused by the starting resistance not being short circuited. If a magnetic starter is used probably one of the contactors is not picking up properly.

If a manual type starter is used maybe the handle is not moved all the way to the full running position, which will not short circuit the last point of resistance. This condition may be caused by badly burned contacts.

There may also be a poor contact somewhere in the armature circuit; however, this is unlikely as it would show itself by marked slowing down and picking up of speed.

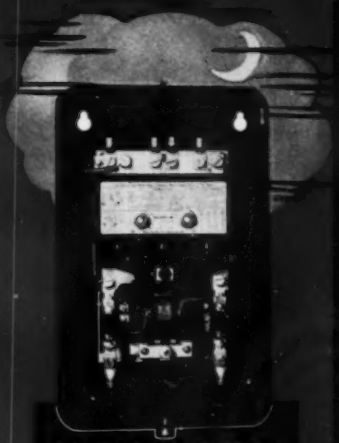
Q. *An unbalanced running current is indicated when an ammeter is connected in each leg of a 440-volt, three-phase squirrel cage motor. The stator winding is star-connected. The resistance of each phase is identical, when measured from terminal to star-connection. What is the cause of the unbalance?*

A. If the current varies, there may be two causes: (1) unequal air gap by the rotor being out of round, (2) poor contacts between some rotor bars and the end ring.

If the unbalance is in one leg continuously, there may be two causes; (1) contacts, fuses, relays in the control box, (2) reversed coil or coils. To test for a reversed coil, connect the stator winding to a low-voltage, three-phase circuit for a few minutes. The reversed coil will be detected by excessive heating.

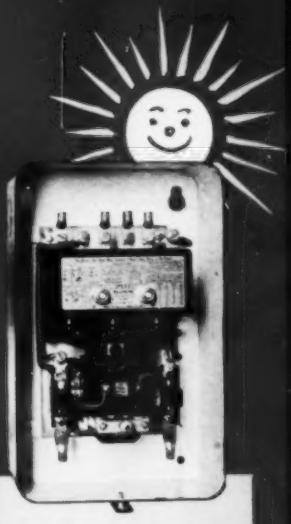
"Look, he always wanted a white bathroom!"

Philbert likes the bright, clean appearance of the inside of the Allen-Bradley Bulletin 709 solenoid starter. Engineers like the way it reflects light and illuminates the starter in dark corners. They also like the double break, silver alloy contacts that never have to be filed or cleaned. The Allen-Bradley solenoid switch mechanism is so simple that it practically guarantees trouble-free operation. This rugged starter will provide complete satisfaction under the toughest conditions.



NOT DARK

Unretouched photograph showing how dark a Bulletin 709 solenoid starter would look if the inside were painted black instead of white.



—BUT BRIGHT

Unretouched photograph showing how the Bulletin 709 actually looks with its white enameled interior lighting up the starter.

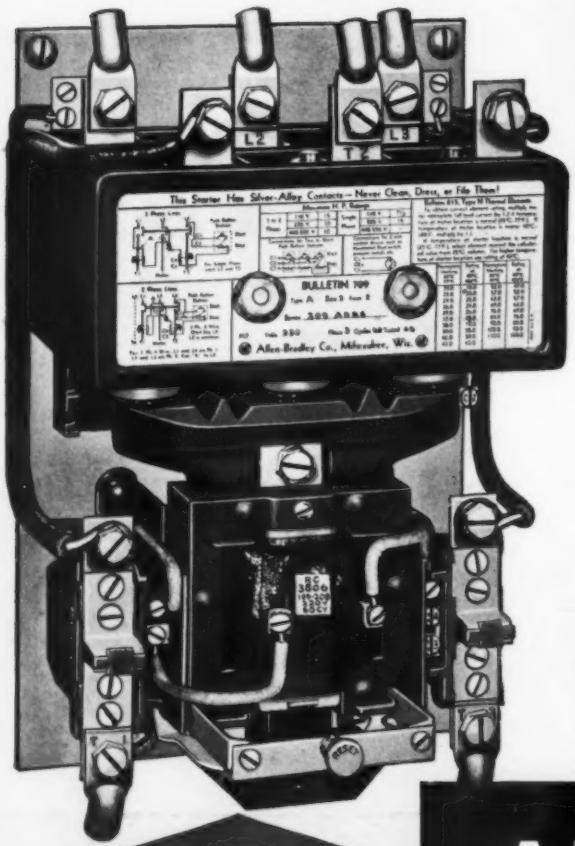
A-B

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

Scrapped—

You won't find these trouble-breeding gadgets on Allen-Bradley Solenoid Starters!



No pivots, hinges, pins, bearings, flexible jumpers, or other complicated mechanisms in Allen-Bradley solenoid starters! That means no corroded or sticky pivots and no broken jumpers. The movable contacts are connected directly to the solenoid plunger. Nothing could be simpler or more trouble-free. Operation of the plunger in its core is practically frictionless. Hence, switch action is not delayed. Designers of high-speed machine tools can rely upon this starter's precise and consistent operation.

Then too, the double break, silver alloy contacts never require filing. Consequently, valuable contact life is not wasted. Although unusually compact, Allen-Bradley solenoid starters can easily disrupt currents of not less than ten times their maximum horsepower rating. Write for 24-page booklet, "The Story of the Solenoid Starter." Allen-Bradley Co., 1307 S. First St., Milwaukee, Wis.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL

Detroit Tries "CNX"

[FROM PAGE 15]

per cent which, added to the saving in material cost, "makes it possible to install an additional outlet cheaper than the owner can run an extension cord."

Save on Roughing

Rogerson's estimate of the economy is borne out by the report of another prominent house wiring contractor, the Lowry Electric Company. The savings, he reports, are limited to the roughing in operations. In material, the only difference is the cost of the cable. CNX #14 in 2-conductor is priced at $18.80 per thousand feet as compared with Romex at $20.55. In a 50-outlet job the cost of the CNX averages about $45 less than the Romex. According to these contractors, however, the labor cost is materially reduced by the smaller size of the cable, ease of stripping and the elimination of taped joints on the neutral conductor. This increases the number of wires easily handled in one box.

These savings are typical of the reports of several Detroit house wiring contractors, but there are some who oppose the entire program. They contend that there has been too little increase in number of outlets to warrant a cheaper wiring system. They say that the savings in wiring cost go into the builders pocket and not into additional outlets. They believe that the "lowering of the code standards" to permit the use of CNX means "a step backward in the protection against hazard which the industry has built up over many years." The total wiring system is already an insignificant part of the cost of a house, according to these contractors, and the number of outlets is controlled by public demand without regard to the unit cost per outlet.

Outlet Average

The Detroit statistics show a present average of 48 outlets for a two bedroom house, 69 for a three bedroom house, and 117 for a four bedroom house. This is an increase of 10 to 14 per cent in a period of two years.

In comparison with these figures, an analysis of house wiring in Chicago during the same period shows a general average of 10 openings per principal room or an average of 50 openings in a two bedroom house. The increase in average number of outlets in Chicago over a period of two years is reported at 10 to 15 per cent or, approximately, the same as the Detroit figures. In Chicago the wiring system most commonly used is armored cable, with basement wiring in conduit.

Today, there are 1,000 homes in and around Detroit wired under this program. According to the supervisors this represents approximately 60 per cent of the total house work. Each job is checked over by an engineer from the Detroit Edison Company before regular inspection. In the early stages, megger insulation tests were made before and after interior finishing. Over two hundred jobs were tested before this procedure was abandoned. Defects, detected by this method, were found to be badly taped joints, damaged fittings and similar trouble, which had no specific reference to the type of wiring system employed.

The idea behind the megger tests was to show up weak points in the wiring system. Faults which might eventually cause trouble were in this way detected in advance. This method is recommended for "trial installations" by the Electrical Committee of the National Fire Protection Association. It was adopted by the utility engineers and inspectors as an assurance of safety. Once past this test in the completed building, it was considered unlikely that the wiring system, in itself, would develop trouble without severe mechanical damage from an external course. The probability of such damage was limited by requiring each installation to comply strictly with the code requirements for non-metallic sheath cable.

Chief Inspector B. W. Clark of the Detroit Electrical Inspection Department places his personal approval on CNX. He reports, "We are entirely satisfied with the way this cable has stood up under actual use." He anticipates early code acceptance, but adds that strict supervision and individual special permission will continue to be required by his department until that time.

Further Plans

The adoption of CNX, however, is only the beginning of the Detroit program. The next step is now under way. This is an educational program with the contractors, builders and home owners. The plan is that through a subfeeder wiring system the copper capacity will be increased two to three times. Branch distribution centers on the first and second floors will be the "trade mark" that will indicate to the public that the wiring system is up to the best modern standards.

This second step is considered fundamental to the program. The wiring system proposed reduces the unit cost per outlet as the number of outlets increase. This is shown on the diagram on page 15. But the speculative builder still controls the house wiring outlet average. He will respond only to a public demand for more wiring or to some conspicuous feature that he can sell to the prospective customer. The new wiring system aims to provide that feature. The educational program is designed to create the demand.

As to Safety

The Detroit trial has shown that CNX wiring is safe, according to Ben Clark, who heads up the inspectors there, and those contractors who have done the most of this work are equally convinced. Even those opposed to the wiring program admit that there is little foundation for further criticism on that point. That it is cheaper both in installation and material costs is claimed by many of the contractors who have handled it. However, there are others who hold that there is no outstanding evidence, in the present phase of the wiring program, that it has been vital to improvement in either adequate wiring or the contractor's balance sheet.

"Cripes! Can't you get nothin' through your head?

Better Lighting

Selling Light to Printing Plants

TO HELP YOU SELL

In every city there are many places where a contractor can sell a better lighting job, if he knows what the prospect needs and how to provide it.

This article presents simple, practical data to help sell print shops. Similar articles will follow each month in this department, showing how to light other industrial and commercial buildings.

Use them and these suggestions will open the door to much new business and make successful installations sure.

Printing shops as a class are better lighted on the average than other industries. However, there are more than 22,000 of these plants around the country and almost all need some alterations in their present lighting systems, at least in some department.

Also, the method of applying light differs with various departments and this gives the contractor an opportunity. Spot the area where a new lighting job will show up to the best advantage.

Recent studies by lighting engineers have brought out lighting equipment specially designed to meet the needs of the printing industry. These developments have opened up still more new sales possibilities for relighting, particularly in composing and press rooms.

Where to Start

Unless the composing room has been lighted within the last two years, it will probably be the best place to begin. Low brightness, "sky lights" or hoods give a smooth even lighting that will soon have the shop men talking. A good approach is to take along your light meter and stop in after the sun goes down. Show the shop superintendent what lighting conditions the night shift works under. After the first relighting is in, that installation will be your best salesman. Follow it up in the press room and the bindery.

One of the most effective sales methods in this, or any other, plant is the trial installation. The power company and your jobber will both cooperate with you. Get them to furnish the units. Put them up and let them tell your story. Don't light up the whole area. Leave enough of the old lighting in service to contrast the old and new.

In laying out the lighting system, the following factors must be considered:

1—General lighting should be independent of daylight.

2—Intensities should be adequate for difficult seeing tasks.

3—Lighting units should be properly located with respect to the machines served.

Progress in the printing arts has made many present lighting systems obsolete. High gloss papers, metallic inks, high speed presses, complicate the printer's seeing job. He must be shown how color matching, type selection and machine adjustments depend on good vision under artificial light. The following layout suggestions are based upon lighting needs as they exist today in the average print shop.

Offices—General lighting should be provided to give a minimum of 20 foot candles of illumination in the office area. The use of semi-indirect or full-indirect luminaires is recommended. However, the treatment of this space in a printing plant follows the same rules as any office space. The layout shown assumes a 12 foot ceiling finished white or light buff.

The Library is frequently used for conferences with customers. Indirect units are recommended, equipped with three-light lamps, to give intensities up to 30 foot candles when necessary. A color correcting low brightness unit directly over the library table will allow varnished stock and metallic inks to show to the best advantage.

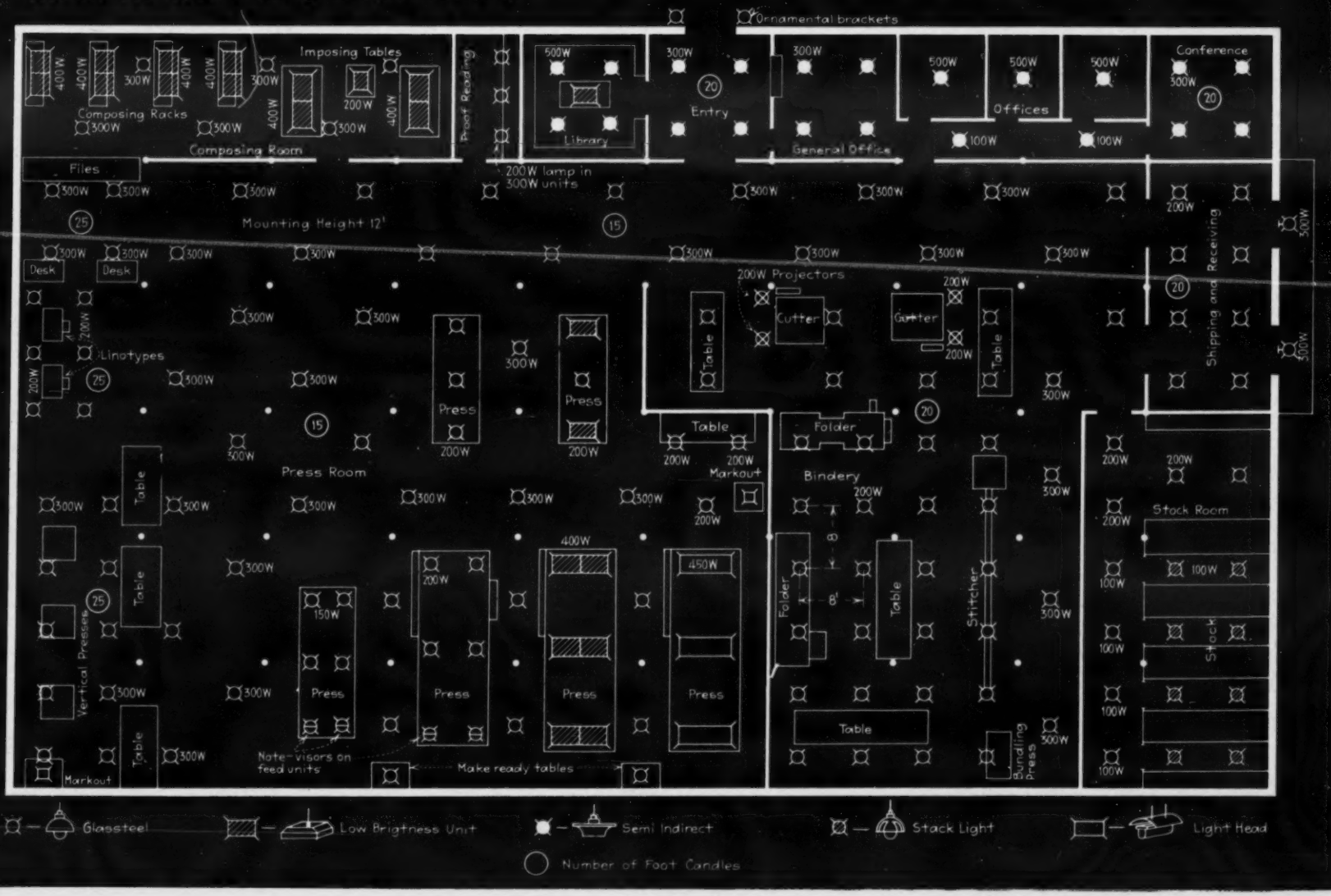
Composing Room—Type acts on the eye as a group of tiny highly polished mirrors. Fixtures with large, low brightness diffusing surfaces have been designed for this kind of work. These units are recommended for typesetting and composing tables. At least 50 foot candles should be provided for these tasks. The surrounding area should also be illuminated to 15 foot candles to avoid excessive contrast.

An intensity of 25 foot candles is recommended for linotype and monotype operations.

GOOD LIGHTING in this composing room reduces errors and eye fatigue to a minimum and soon pays for itself in time saved.

GOOD LIGHTING APPLIED TO A TYPICAL PRINTING PLANT

Recommended layout showing the outlet locations, lighting intensities and type of lighting equipment in the various departments.



Better Lighting

[FROM PAGE 56]

Press Room—Automatic vertical presses may be lighted by a single low brightness hood mounted directly above. The most common practice, however, is to provide a high intensity of general illumination over the small press area. From 25 to 30 foot candles is recommended.

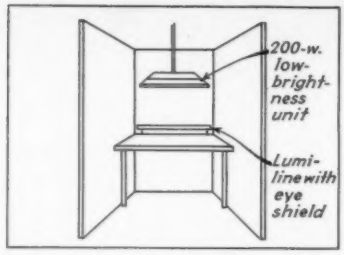
The standard flat bed press requires individual treatment and several methods are shown on the diagram. Smaller presses similar to the Miehle 1/0 will require three lighting units, one directly above the feed board, one over the cylinder and the third over the delivery. Under ordinary conditions, glass-steel units will be satisfactory. But where varnished stock and high gloss inks are frequently used, low brightness units should be installed over the feed board and delivery.

Larger presses require six units for correct light distribution, two over each end and two over the cylinder. Low brightness units are recommended here too. The indirect "light hood" has also been applied to press lighting with excellent results. Where ceilings are too low for mounting units above the press, angle type reflectors along the side, directed onto the press, will give best results.

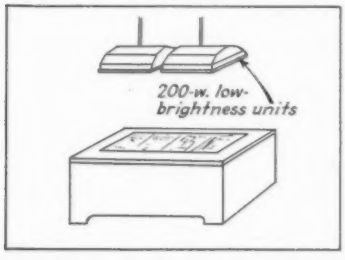
General lighting of 15 foot candles around the presses should be provided for "make ready" and press adjustment.

Bindery—Most bindery operations are purely mechanical; however, good general lighting of at least 20 foot candles should be provided. Paper drills and cutters will require careful location of the lighting units. Two units, on a line with the sides of the machine and directly over the operator, will provide the best distribution.

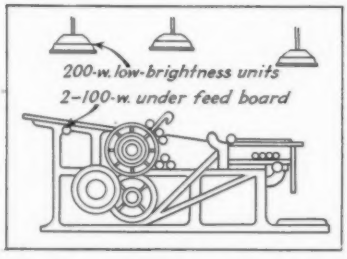
The accompanying printing plant diagram shows these layout principles applied. While the arrangement of the equipment in other plants will vary from that shown, to obtain the recommended light values, individual areas may be treated in the same way as similar areas in the diagram.



MARKOUT BOOTH requires critical seeing under fixed lighting conditions. A low brightness unit over the table and a shielded lumiline strip do the job.



IMPOSING STONE lighting, showing two low brightness units clamped together to provide a perfect lighting source for this work.

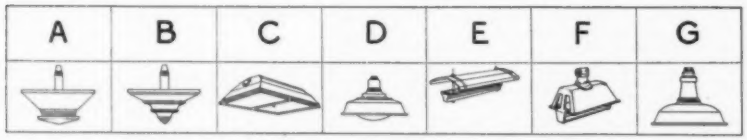


PRESS LIGHTING with low brightness units for critical seeing. Under feed board lighting is provided by two permanently mounted reflectors.

RECOMMENDED LIGHTING INTENSITIES AND TYPES OF LIGHTING UNITS FOR THE PRINTING PLANT.

	Foot candles	Type of unit	
Entry and Offices.	15	Semi indirect	A
Library — General	30	Indirect	B
Library over center table	50	Hood	C
Composing Room General	15	Glassteel	D
Composing Room Over type cases	50	Hood	C
Shop office	25	Glassteel	D
Linotypes	20	Glassteel	D
Presses*	30	Hood	C-E
		Glassteel	D
Proof Reading	25	Glassteel	D
General Lighting	15	Glassteel	D
Bindery	20	Glassteel	D
Stock Room	15	Stock Lights	F
Shipping & Receiving	15	RLM dome	G
Markout booth	50	Hood	C

*Note—Three types of press lighting are shown on the accompanying diagram.



Pictorial index to types of units in the above table.

***SPORTS LIGHTING**—University of Wisconsin, Field House, Madison, showing the lighting arrangement for the bleachers, using an RLM Abolite reflector, with a threaded type neck to allow the removal of the reflector for cleaning. This lighting is designed to allow the crowds of spectators to move freely without stumbling.*

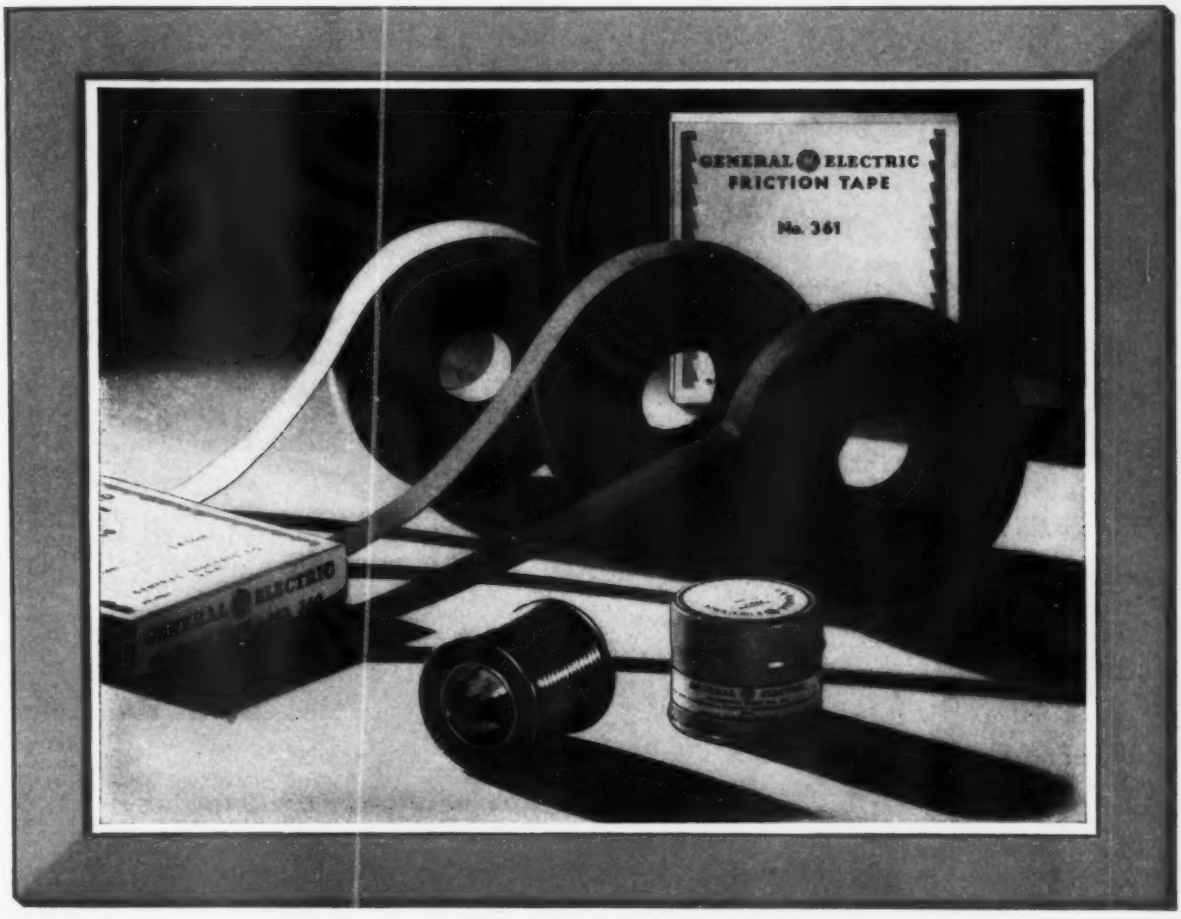
LUMINOUS ADVERTISING

Acceptance of the luminous building idea in any community is dependent upon the presence of a well-executed example. Regardless of the size of the display, it must be designed to popularize the idea.

Because of the difficulty of describing lighting effects in this field there is perhaps no better aid to salesmanship than visual demonstration. The best way to get this is to have a good specimen read-

***SAMPLE SIGN**—This kind of a display installed is the first step in selling luminous advertising.*

Quality work depends on quality materials



Your work can be no better than the materials you work with. Always use G-E Insulating Materials and you can be sure you are using only the highest quality. General Electric Insulating Materials give you an extra margin of quality that helps make that extra margin of profit. The General Electric Company uses these same insulating materials in the manufacture of its products. G-E Insulating Materials give you a dependability that you can rely upon. Their continued long life reduces profit consuming maintenance costs. They meet all electrical requirements. Still, they cost no more than the ordinary materials. Get the most for your money. See your nearest G-E Merchandise Distributor — He can give you complete information and prompt service; or write to Section M-8171, Appliance and Merchandise Department, General Electric, Co., Bridgeport, Conn.

GENERAL ELECTRIC

INSULATING MATERIALS

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

Better Lighting

[FROM PAGE 58]

ily available, for the progress of luminous structures in many towns is hampered until the initial installation makes its appearance. When it does, the lighting salesman should make the most of it. He should be sure that all prospective customers learn its significance and understand its advertising values.

The photograph shown here, while illustrating a relatively small display, nevertheless indicates the points of good design—simplicity, economical advertising and directness of appeal. The sign has seven letters which are all 20 inches high. Each is separately cut from ¼-inch plywood, painted black and cemented to a background of flashed opal glass. The glass panel is 13.5 feet by 28 inches. The lighting of the sign is from twenty-four 50-watt lamps on 14-inch centers located in two rows behind the glass panel.

BIGGEST SHOW ON EARTH

Somebody in Buffalo has had a thrill and is passing it along. It is worth using. It appears in broadsides on store lighting recently sent to 5500 commercial establishments by the Electrical League of the Niagara Frontier. It is headed "The Biggest Show on Earth". It reads—

"Many facetted glittering gems, glamorous jewels in exotic settings, gleaming white table linens setting off glistening crystal and flatware, hand rubbed many hued radios, tables and chairs upholstered in many toned fabrics of inviting comfort, form enhancing dresses in blending tints and shades alongside mannish suits of coarser touch, and filmy dainties that defy the tenderest caress.

These and many more alluring sights fill the windows that every day in the year line the streets of our American cities. Compared with these, the oriental extravaganzas of feast day and bazaar, of bejewelled elephant and camel, of tent and palanquin fade into slumbering indifference.

American merchants have stolen the show from the rest of the world and are daily presenting to the people of America the biggest show on earth, attracting the biggest audience of any extravaganza of orient or occident of ancient or modern times.

The proper use of light to attract people to their stores, to set merchandise off alluringly, to put customers and employees in a jovial mood, to step up store efficiency and alertness is without doubt the principal contributing cause for the success of American merchants."

THREE WAYS TO LIGHT BENCHES

ONE—With Glassteel Diffusers carrying 300-watt lamps and spaced on 7 by 8 foot centers. The units provide a flood of high quality illumination of the order of 40 footcandles on both the wall and center benches.

TWO—With the new trough unit and 200-watt lamps on 30-inch centers. When mounted 30 inches above the work bench it provides some 45 footcandles of well diffused glareless illumination.

THREE—With supplementary units above the benches and so directed as to build up the level of illumination at those points where the seeing requirements necessitate a high level of lighting. Equipped with 200-watt lamps the system produces approximately 100 footcandles on the benches.

Get the Right Light for every job

WITH WHEELER Quick Changing DURATACH REFLECTORS

EVERY plant, every room, in fact *every job* has its own particular lighting problem. And the only way you can overcome these problems is with careful planning, good lighting equipment, and proper installations.

With Wheeler Reflectors you find it easy to get proper lighting. For Wheeler gives you a complete line of equipment—reflectors of good serviceable construction and with designs and outputs of light capable of meeting every demand.

Furthermore, with Wheeler Duratach Reflectors you get convenient interchangeability of light distribution, so often necessary in many plants. For the New Duratach Separable Socket Construction allows the quick removal of lamp and reflector *as a complete unit*. You can easily change from dome, to bowl, to angular or any other style of Duratach Reflector without disturbing original wiring—to say nothing of the time and money you can save on cleaning and maintenance.

SEND FOR THIS MANUAL

Plan your lighting with Wheeler. Send for our complete 200 page manual. And take advantage of our free, complete engineering service that includes planning, recommendations and blue-prints. Send coupon.

WHEELER REFLECTORS

DISTRIBUTED EXCLUSIVELY THROUGH ELECTRICAL WHOLESALERS

WHEELER REFLECTOR COMPANY
275 Congress St.
Boston, Mass.

Please send a copy of your new 200-page LIGHTING MANUAL.

Name.....
Title.....
Company.....
Address.....
City.....State.....

Questions ON THE Code

Answered by
F. N. M. SQUIRES
Chief Inspector New York Board of Fire Underwriters

Is a Farm Barn Hazardous?

Q. *"I have a question in regard to a 32 volt farm plant where the N. E. Code is enforced. Is it "Code" to use a vapor proof cover on a FS series conduit for a single pole wall switch for controlling lights in the barn on a farm? The State Inspector requires that. Why is it necessary if I may ask? A barn has no more combustible material than a house."*—A. C. B.

A. Some inspection bureaus consider some barns dusty places and classify them under Class 2 Hazardous Locations. There is no doubt but that most hay barns and barns in which hay and straw are stored and handled are dusty and that considerable dust is raised at times when the hay is being stored and also when it is being taken down for use. Also there is no question about the fact that cast outlet boxes with threaded hubs are more dust tight than sheet steel outlet boxes with knockouts and other open holes.

It would seem, therefore, that the inspector referred to has sufficient grounds for his ruling. However, the Code makes no mention of barns in connection with hazardous locations and as far as is known, did not consider farm barns as coming within this category. But local conditions may justify the required use of the fittings mentioned

Another Circuit Problem

Q. *"I have heard many times remark made about using a certain size of wire to the first outlet on a branch circuit and then cutting down the size of wire one size or so from there on to the rest of the outlets on that circuit. I supposed there would have to be a fuse placed whenever a reduction in wire size was made. Of course I understand that one could fuse the circuit for the smallest size wire used but unless one uses the non-tamperable fuse blocks it would be easy to over-fuse by someone else. Please explain the point about cutting wire sizes. This pertains in this case to lighting circuits."*—A. C. B

A. If the run to the first outlet as well as between outlets was of considerable length it might be of advantage, in order to minimize the voltage drop, to use a larger size wire and then reduce. But a series of fuses would not be necessary nor desirable as the circuit where it leaves the panel would have to be fused at not over 15 amperes. This is required for all lighting branch circuits using medium base sockets.

***CORRECTION ORDERS** get results when they go out of the office of Lester R. Strain, Chief Electrical Inspector of Grand Rapids, Michigan. The orders must be returned within a specified time, signed by the contractor making the correction in the wiring system. But it is not necessary to use legal force, according to Mr. Strain. When a balky owner won't cooperate he is asked to come in and talk it over in a friendly way and they come to an understanding.*

Thermal Devices for Motors

Q. *"Inspectors are now requiring protective devices for automatically started motors for oil burners, refrigerators, air-conditioners, in accordance with rule 4322-c. I find it hard to tell just what devices may be used or when the manufacturers are supplying me with the proper devices. Can you advise me on this?*—L. P."

A. According to rule 4322-c, automatically started motors of ½ to 1 HP are required to have at least one of the 3 following types of protection,—

1—Overcurrent protection at not more than 140 percent of the motor ampere rating.

2—Inherent over-heating device.

3—Safety (combustion) controls which are part of an approved assembly.

The devices which may be used to satisfy #1 above are listed by the Laboratories under circuit breakers, fuses (including "Special fuses—not over 600V"), and Industrial Control Equipment (Miscellaneous and Auxiliary Devices, Thermal Overload Relay).

In the use of devices listed under Circuit Breakers and Fuses care must be exercised to select one with the proper ampere rating for the particular motor with which it is to be used. It must be not more than 40 percent more than the ampere rating of the motor. For instance, with a motor rated at, 2.8 amperes, the rating of the protective device should not exceed (2.8 amp. x 140% = 3.92 amps) 4 amperes. This rating must, of course, be marked on the device.

With Circuit Breakers listed with an asterisk (*), the device and the circuit must be protected by a branch circuit fuse not larger than 15 amperes. Also with a thermal cutout, listed under "Special Fuses" the cutout must be protected by a fuse in accordance with size marked on thermal cutout.

With the devices listed under "Industrial Control Equipment — Miscellaneous — Temperature — Operated Switches"—there has been considerable confusion. Some of these devices may be the "Inherent Overheating Devices" mentioned in #2 above and will be discussed below. Some of them may be thermal devices actuated by heat developed in themselves. Some of them may be a combination of these two schemes.

If this "Temperature-Operated Switch" is for general use with any motor it must bear an ampere rating at not over 140 percent of the rating of the motor with which it is to be used. It must also be marked with the manufacturer's identification (includ-

Questions on the Code

[FROM PAGE 62]

ing catalogue number or model or style number) in order that it may be fully identified with the listing in the Laboratories book. If the device is a combination of the inherent overheating device and current operated (thermal) device, it must have an ampere rating as above or be listed and marked as below.

This takes us up to devices to satisfy #2. This type of inherent overheating device is one which operates to open the electric circuit when actuated by the heat developed in the frame of the motor, to which it is directly attached. Unless it is of the combination type mentioned above, it does not develop any heat in itself but only picks up the heat of the motor and is actuated by that heat when the motor gets too hot.

This device must be listed in connection with the motor with which it is to be used and in the field care must be exercised to check both the motor and this device in accordance with their markings. The Laboratories are requiring very plain and distinctive markings by the manufacturers, so that the confusion may disappear.

Some of this confusion has arisen over the fact that an oil burner manufacturer using a motor manufacturer's motor with its listed thermal device did not use the motor manufacturer's name plate but used his oil burner name plate. Naturally this did not correspond with the listing and the inspector turned it down. The inspector was perfectly right in doing this as the oil burner manufacturer should have received a listing for the motor *and its device* under his own name.

Next is in reference to #3. This should only be accepted when the Laboratories in their listing and on their oil burner label show that they have tested and approved the whole assembly of combustion controls, and found that they operate to protect the motor in the case of a stalled rotor. So far as is known to the writer only one oil burner manufacturer has asked for such a test and, therefore, there is but one burner which will satisfy this method of protection.

WISCONSIN CODE—*Committee meets to recommend changes in the state rules to conform with the 1937 National revision; left to right: W. S. Wilder, The Milwaukee Electric Railway & Light Company; G. H. Andrae, Herman Andrae Electric Company, chairman of the committee, W. A. Haig, Milwaukee Chief Electrical Inspector; John E. Wise, of the Industrial Commission; J. B. Wilkinson, Board of Fire Underwriters.*

Heavy Duty Lamps

Q. *"Is it permissible to use eight 750-watt lamps on a 3-wire #10 circuit and fuse it to 30 amps.?—S. G. A."*

A. The answer is No. For as a 3-wire circuit is to be used there would of course, be four of the lamps on each side of the circuit. So, 4 x 750 = 3000 watts ÷ 110 volt = 27 amps. This is too much for a 25 amp. circuit so we must go to the 35 amp. circuit.

Rules 2152 and 2153 tell us that the conductors must be not less than #8 and that the fuse protection for this must be not over 35 amps. It would probably be well not to attempt to use 30 amp. fuses on this circuit, because of the inrush current of the cold filaments. Of course a "T" rated switch should be used.

Fuse Refills in Multiple

Q. *"In a renewable cartridge fuse casing, is it permissible to use two or more refill strips in multiple, providing the capacity of the casing or of the wire to be protected is not exceeded?*—C. McC."

A. The Code in rule 2411, objects to the use of fuses in multiple, except where fuse protection is required in capacities exceeding the capacity of enclosed fuses. But there is no direct rule covering the use of refills of renewable fuses in multiple in a single casing. Such a practice should not be permitted.

A casing is designed to accommodate a single refill of a certain size. We do not know that two or more refills in multiple will properly fit such a casing or that the performance of 3-10 amp. refills in a 30 amp. casing, for instance, will be the same as that of a single refill or 30 amps.

It is to be hoped that some day the Code will carry a ruling which will make it impossible to place more than one refill into a casing. Many cases are found where the capacities of the multiple refills used greatly exceed the cartridge and the wire sizes.

Questions ON Signalling

Answered by
ALBERT A. SCHUHLER

Call System for Psychopathic Hospitals

Q. *Our institution is contemplating setting aside a part of the building for psychopathic purposes. Since these patients are not responsible for their acts and may become violent, they require supervision. Some method of signaling must be provided for attendants to summon assistance.*

Several patients' rooms, as well as the solariums and recreation rooms are to be equipped with call stations. What is the correct system to employ?—I.S.

A. A system for psychopathic hospitals should be of a type particularly designed for this special service. Primarily it should be so arranged, that an attendant may summon assistance to a given point. It should also be designed so that patients cannot operate the system.

The usual system consists of a control station outside of each room where service is required, this station being operated by means of a key. Turning of the key will send current to the station or stations inside of the room. Operation of the key will also cause a lamp to be lighted either on the control station, or above the door just outside of the room to indicate that the attendant has entered the room.

In the event of an emergency, the attendant may operate any station in the room, causing a second distinctive signal lamp to operate outside of the room. This action will also energize an annunciator lamp signal at one or more supervisory points. The room numbers are designated on these annunciator signals. In addition, audible signals such as bells or buzzers, will operate continuously at the supervisory points. The annunciators and door lamp stations direct assistance to the room in which the signal originates. All signals are cancelled when the control stations outside of the patient's room are reset by means of a key.

Under no circumstances should cord type stations be used similar to those used for regular nurses' call systems. It is obvious that such stations would sure start trouble.

Connections From Door to Door Frame

Q. *Very frequently it is found necessary to make an electrical low-tension connection between the door and the door frame. The object is to connect an electrical burglar alarm lock, a burglar alarm lock-switch, tinfoil for protecting a glass panel in the door, or a protective wooden lattice frame. What is the best method to use?—D. C. B.*

A While some contractors make improvised contact springs to carry their connections through from one point to another, such devices often prove unsatisfactory and are the cause of considerable trouble in protective systems. In the illustration below, a satisfactory method is shown. The connections are made with standard devices available in the open market.

The contact devices used in the door frame are known as "safe-springs," while the devices used in the hinged edge of the door are known as "safe-spring plates." The sketches indicate how these devices are installed, how the connections are established, and the relative position of the units when the door is closed.

Microphonic Protection System

Q. *What means may be found for transmitting an alarm to a remote location, in the event unusual or loud sounds are originated at a specified point to be protected?—J.C.*

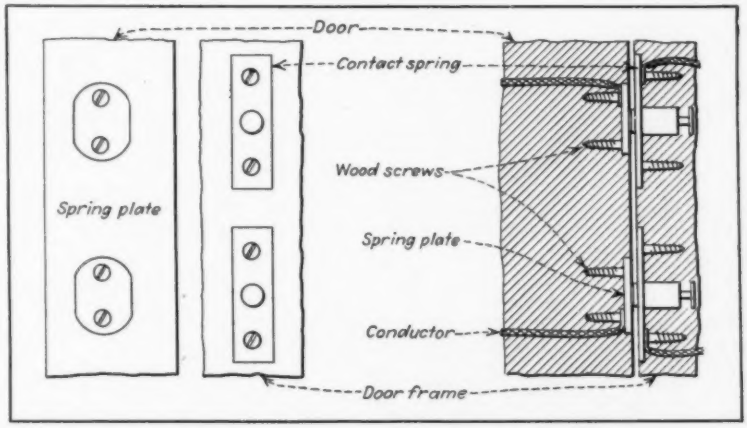
A. A microphonic protection system may be used to meet this requirement. In general this system would consist of a microphonic detector enclosed in a cabinet and would be provided with an audible test device. In addition, a control cabinet would be provided for supervising the microphone circuit.

The audible signal usually consists of a unit having a microphonic sound, in order to distinguish this sound from any other audible signal.

This type of system is adaptable for use in protecting a vault or other enclosure by means of sound detection. It is provided with adjustable features which regulate the sensitivity of the microphonic detectors, to meet the requirements of variation in vault construction. Protection against false alarms due to vibration is also provided.

Lift Signal System

Q. *Please send sketch of a signal system which may be used in a lift. We wish to have some means of*



***PROTECTED DOORS**—Trouble-proof contact devices for door-operated signalling.*

PANTHER *and* DRAGON TAPES

1. First to be Wrapped and SEALED in Cellophane.
2. Perfect Adhesiveness and Tensile Strength.
3. Strong Distinctive Green Core.
4. Colorful Attractive Boxes.
5. A Company in the Insulation Business Since 1878.

HAZARD INSULATED WIRE WORKS

Division of **THE OKONITE COMPANY**

FACTORIES: WILKES-BARRE, PA. · PASSAIC, N. J.

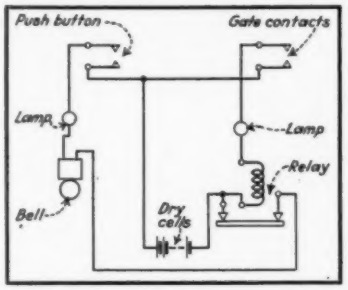
WE STILL MAINTAIN OUR ORIGINAL POLICY OF SELLING THESE TAPES THROUGH LEGITIMATE WHOLESALERS ONLY

Questions on Signaling

[FROM PAGE 66]

signaling the lift operator, and also have protection on the gate located on a specified floor.—J.E.

A. The accompanying drawing shows a system of signaling and protection. The signal system consists of an audible and a visual signal which will operate from its respective push button when the gate is closed. The protective system consists of a contact spring placed on the gate, with a pilot lamp as a visual signal to be placed near the operator.



LIFT PROTECTION—Wiring plan for signal to lift operator and gate protection

Normally the gate is open, so that the lift may be loaded. Then contacts on the gate are on open-circuit and all signals are inoperative. When the gate is closed, the contact springs are on closed-circuit, and cause the coil of the non-locking relay to become energized, and to operate the pilot light. The signal system may then be operated by pushing the button to advise the lift operator that the lift may be operated.

Burglar Alarm Checks Entrance Locks

Q. *A closed-circuit burglar alarm system now being used in a warehouse seems to be satisfactory for ordinary purposes. However, it now appears necessary to obtain some means of checking the opening and the closing of the main entrance and the shipping department doors.*

What device may be used to obtain this extra protection at the points mentioned above?—H.S.

A. A burglar alarm time clock may be used very satisfactorily in a case of this kind, as it provides a time record of employees opening or closing the premises. This device employs the use of a paper dial, and each locking and unlocking of the door is recorded upon this dial by means of a perforation.

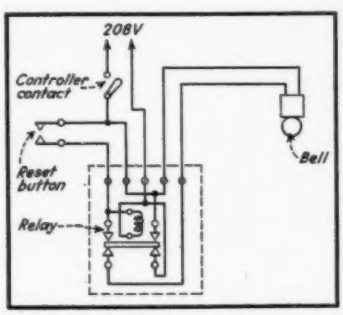
The time lock is so arranged that the one key controls the dial compartment, while another key controls the lock to the door of the establishment. This prevents tampering with, or the changing of dials by anyone not in authority. In addition, this device may be arranged as a shunt for the alarm system and to record the time when the system was placed in operation.

It is also possible to supervise a private street patrolman, as his calls are registered by means of a separate attachment, and this feature is operated from the outside of the premises.

Conveyor Signal System

Q. *In the operation of a conveyor, it is necessary to signal the attendant when the conveyor starts. This signal is to be a bell, and is to operate continuously until the attendant arrives, and resets the signal. Several conveyors are used in this establishment, and each has a separate system of signaling. The service is 208 volts, 60 cycle, A.C.—H.B.*

A. Here is a typical circuit for a conveyor system. In this system, a bell is located near the conveyor. Also a non-locking relay is provided together with a reset pushbutton for resetting the relay. Operation of the controller for the motor operates the bell. Operation of the reset button energizes the relay, so that the relay armature lifts and opens the circuit to the bell. The armature remains in this position until the controller is placed once more in the "off" position and the circuit clears.



CONVEYOR CONTROL—Wiring connections to notify operators when a conveyor starts

Benjamin Electric Photo

that makes this installation COMPLETELY AUTOMATIC

"The tail wags the dog"! Compared to the total cost of a floodlighting installation, a time-switch costs but little. And yet . . . . the time-switch is responsible for making use of the lights when they're wanted - thus assuring full returns from the whole investment.

Your customers will understand this kind of talk - and then they'll want the best. And that's where the Unseen Hand comes in.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

In the News

BRAND AWARDED MEDAL FOR COOPERATION

Edward A. Brand, commercial engineer with the Buffalo, Niagara and Eastern Power Corporation has received the James H. McGraw Medal for Cooperation for 1937. The medal was presented in Buffalo, on November 30, at a testimonial dinner

RECOGNITION—Edward A. Brand receives McGraw Medal for Cooperation.

sponsored by the Electrical League of the Niagara Frontier. The citation was as follows—

Edward A. Brand, commercial engineer with the Buffalo, Niagara and Eastern Power Corporation, as chairman of the Wiring Committee of the National Electric Light Association, and later of the Industry Committee on Interior Wiring Design, recognized that the development of public interest and acceptance of better adequacy standards for electric wiring could not be achieved without unity of thought and purpose within the electrical industry itself. He undertook responsibility for molding sentiment within the several branches of the industry for the definition, adoption and promotion of adequacy standards, upon which public education for the modernization of wiring might be based.

He has stimulated and guided the activities of a large joint committee composed of representatives of all sections of the industry, among whom viewpoints and interests frequently have been widely divergent. For two years he was persistently carried forward toward the ultimate common purpose with a breadth of knowledge, a clarity of vision, a tolerance of opinion and a cooperative spirit that has won him the admiration and support of all groups.

He has successfully brought to conclusion the adoption of standards for interior wiring design, that for the first time provide a clear concept of what constitutes adequacy, on a basis that may be progressively advanced as public acceptance warrants. Also, these standards have prepared a foundation of common agreement and closer team work upon which the electrical industry's Adequate Wiring Promotion Program has been organized.

In recognition of this distinguished contribution to the advancement of cooperation in the electrical industry, the judges have awarded to Mr. Brand the Medal and Purse for Cooperation for 1937, given under the James H. McGraw Award.

Mr. Brand was selected for this honor by the following committee of judges—

J. L. Busey, president, General Electric Supply Co., Bridgeport; J. L. Flagg, president, Watson Flagg Engineering Co., Inc., New York; Charles E. Swartzbaugh, president, Swartzbaugh Manufacturing Co., Toledo; George E. Whitwell, vice-president, Philadelphia Electric Co., Philadelphia.

The award was presented to Mr. Brand by Earl Whitehorne, editor of *Electrical Contracting* and member of the Committee of Awards. Floyd Carlisle, Chairman of the Niagara Hudson Power Company, made the principal address.

AGRICULTURAL ENGINEERS TALK WIRING

One of the principal problems of rural wiring has been the lack of uniform standards for bidding on wiring jobs, according to Oscar W. Meier, Utilization Division, Rural Electrification Administration. The wiring contractor is faced with the costly procedure of soliciting work over a wide area and submitting bids, without common standards, against the competition of inferior work. So the conscientious contractor finally gets a widely scattered group of jobs that can not be efficiently handled.

In a paper presented at the Fall Meeting of the Rural Electric Session, American Society of Agricultural Engineers in Chicago, Mr. Meier told of the efforts that REA is putting forth to provide safe and adequate wiring standards. REA has prepared wiring specifications and suggested procedure for group bidding. The farms are divided into groups of 25 or more in the same general area. The contractor then bids on a unit basis for all of these farms. After contracts have been awarded a definite work order may be written up

FARM WIRING by group bidding urged on REA jobs by Oscar W. Meier.

for each farm, stipulating the work to be done at the quoted unit prices.

This procedure is expected to attract competent contractors to undertake farm wiring work. Where suitable inspection

Housing Prospect?

Electrical installations promise to march on not only toward an all time high, but as the banner line of business in the country. The housing situation is the one thing on which President and Congress are agreed upon as something the government can do about the recession. Also, there are many indications that federal economy will not be applied as rigidly as expected to rural electrification.

This year REA had 30 millions minus the 10 percent economy holdback, or 27 million. Next year it is fairly sure of at least 30 millions, and actually expecting something more than 33 millions. This would just give it the appropriation originally intended for the year beginning July 1 next, plus the holdback for this fiscal year. The real optimists hope for 40 millions.

In addition there is always the possibility of heavy federal spending. This for a time seemed to be out the window in the face of the President's desire to balance the budget. It may be resumed because of relief necessities.

From CARTER FIELD
Washington Bureau
McGraw-Hill Publications

ELECTRICAL BUYERS REFERENCE

1938

"Who Makes It"

Published by
ELECTRICAL CONTRACTING
NEW YORK

SAVE

TIME AND MONEY WITH THIS *Electrical* BUYERS REFERENCE . . .

A WEALTH OF HANDY BUYING INFORMATION THAT WILL MAKE your work easier is included in the 1938 Electrical Buyers Reference. If you want information on any electrical product or manufacturer, look first in this improved edition.

For Example:

Want to know who makes **Switches?** Just turn to the S's in this section and you will find a complete list of switch manufacturers plus descriptions of the individual makes in many cases.

Trying to locate a product with trade name "American"? A simple reference to the alphabetical tabulation of trade and company names (page 854) will locate the product for you immediately. Remember, if you want quick information on any Electrical Product or Manufacturer, look first in

ELECTRICAL BUYERS REFERENCE

★

Published Annually by **ELECTRICAL CONTRACTING** A McGRAW-HILL PUBLICATION

Wire for the H&H Path of Light all through the house

Plan to put SWITCHES at all room entrances, so a person walks in a PATH OF LIGHT from one room to another! Eliminate stumbling in the dark when passing *anywhere* through the house, or up and down stairs. Install THREE-WAY switches at *both* entrances of a large room, to turn lights on or off at either doorway. This is the new idea of CONVENIENCE — which helps make owners "see the light" in the matter of adequate wiring...Number 8601 Single-Pole Switch; Number 8603 Three-Way, *execute the idea!*

SOLD THROUGH YOUR ELECTRICAL WHOLESALER

HART & HEGEMAN DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

[FROM PAGE 70]

systems have been set up in individual states, the Administrator advises borrowers that wiring installations must be approved by an accredited inspection agency before being connected to the lines.

Round table discussions among the agricultural engineers indicated a growing concern over the hazards involved in the application of electricity on the farm. In discussing the growing use of electric fences, it was urged that the state inspector be permitted wide discretionary power in condemning amateur installations. The narrow margin between shock currents, and currents dangerous to life, requires controllers built to exact engineering specifications and installed with careful consideration of the hazards involved. Individuals in the group feel that the answer to farm electric hazards is to be found in more rigid inspection and the development of fool proof wiring materials and methods, combined with a broad program of education through the agricultural schools.

WISCONSIN TO REVISE STATE CODE

Changes introduced into the National Electrical Code by the 1937 revision will be adopted by the Wisconsin Industrial Commission and incorporated as amendments to Part Three of the Wisconsin State Electrical Code, to give the Code revisions legal status in that state.

At a recent meeting of the Electrical Advisory Committee a subcommittee was appointed to study the new code requirements and report the changes necessary to make the State Code conform. George Andrae of the Herman Andrae Electric Co. is chairman of the subcommittee. Other members are: John Wise, Wisconsin Industrial Commission, ex-officio secretary; Wm. A. Haig, Milwaukee Electrical Inspection Department; John Wilkinson, Board of Fire Underwriters; Chas. Thurber, International Brotherhood of Electrical Workers; and Willard Wilder, Milwaukee Electric Railway and Light Co.

OLD TIMERS' PARTY—(*1*) *A. S. Schulman, (fourth from left) and Wm. McGuineas, president of the Chicago Electrical Contractors Association (next right). Left of them—W. P. Crockett, E. W. Hearns and A. H. Kahn.* (*2*) *Also C. A. Lundberg of the Wadeford Electric Corp., proudly displayed his badge, and* (*3*) *The Leasure family of contractors took the age record with Harry, Frank and E. E., for E. E. started in '82.*

CHICAGO OLD TIMERS ROUNDUP

Enthusiasm ran high in Chicago on December 2, when "Old Timers" gathered for luncheon at the Palmer House. They outnumbered by two to one those youngsters, who came into the industry since 1912.

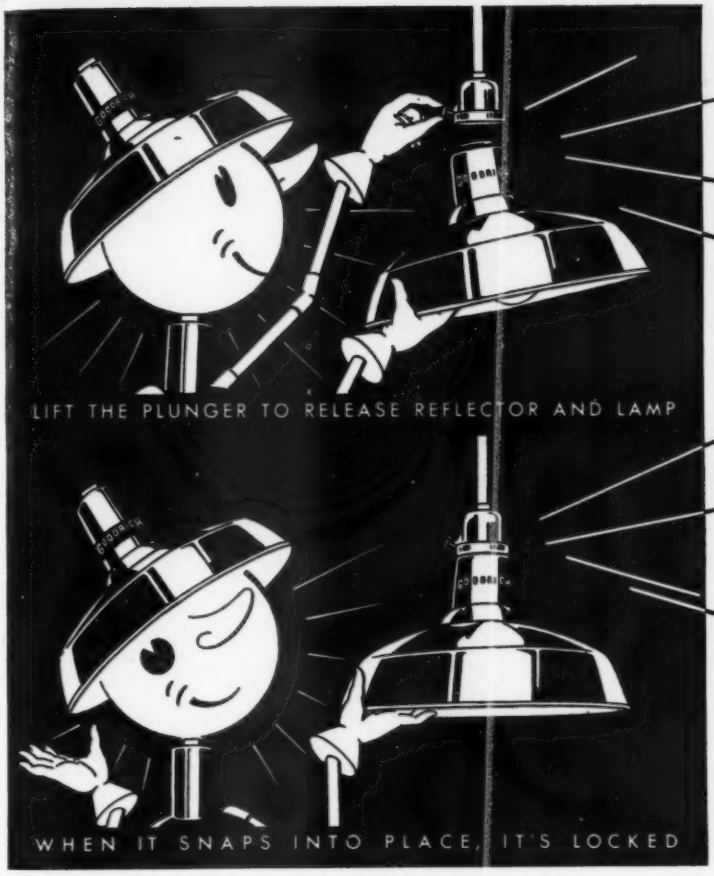
With prominent "Old Timer" speakers on the program, the party carried on in a friendly spirit of reminiscence. The daily strife of competition, conflicting interests and diverse opinions, all were forgotten by these veterans who have fought together for a quarter of a century or more in the common cause. It was a big day that electrical Chicago will not forget.

"Would you sit on that end, Ma'am? — We want to bend this conduit."

BIRMINGHAM SETS UP HOME CERTIFICATION

A plan for certifying wiring in new or old houses has been put into effect by the Electric Association of Birmingham, Ala. A red seal bearing the notation "Wired for All-Electric Service" is being issued when minimum standards of wiring have been met.

To educate the public to the advantages of adequate wiring, a newspaper campaign has been running, employing ads which carry the names of nine electrical contractor members of the Association. An exhibit was also held at a recent home



CLICK IT'S OFF — SNAP IT'S ON AGAIN

"COULD ANYTHING BE EASIER?"
Asks **SUNNY LUMENS**
The Goodrich Reflexpert

DISKONECT REFLECTORS

● You'll find no other detachable reflector to equal the simplicity of the Goodrich Diskonect. It's removed in an instant . . . no fussing with tools or wiring. There's no twisting, no tugging, no forcing to release it. A spring-set plunger does it for you—and does it better! Metal-to-glass contact prevents corrosion—it can't stick even when not removed for long periods.

Complete "COME-APART" Design with Removable Socket

Not only may the reflector and lamp be instantly detached from the hood, but the socket is quickly and easily removable from the reflector for thorough cleaning—a fact which is not true of any other reflector on the market.

You simplify your own job—build good will among your customers when you install Goodrich Diskonect Reflectors. Here are the reasons:

1 **EASIER TO INSTALL**—You only have to wire and attach the hood, reflector and socket can be snapped on later.

2 **EASIER TO CLEAN**—Because you can take it apart or put it together in an instant, it's quicker and easier to keep clean. And it cleans more thoroughly because the socket is instantly removable from the reflector.

3 **EASIER TO MAINTAIN EFFICIENT ILLUMINATION**—Easier removal encourages more frequent cleaning—provides better illumination for workers.

Goodrich Diskonect Reflectors are offered in all standard sizes and shapes. If your jobber doesn't stock them, write us direct.

GOODRICH
ELECTRIC COMPANY
OFFICES IN ALL PRINCIPAL CITIES

GENERAL OFFICES & FACTORY, 2902 NORTH OAKLEY AVENUE, CHICAGO, ILLINOIS

In the News

[FROM PAGE 72]

show. A "Check Chart" has been prepared by which homeowners can easily check up the wiring facilities in their homes. About 100 outlets and switches are listed on this chart under twelve principal areas in the home.

D. B. Clayton of the Knight Electric Co. is president of the Association. It comprises contractors from Birmingham and Bessemer.

REA ALLOTMENTS

The Rural Electrification Administration has announced these further allotments to build farm lines—

Georgia—$72,000 to Sumter County Elec. Mem. Corp., Americus, to build 72 miles of line to serve 247 customers.

Illinois—$50,000 additional to Menard Electric Cooperative, Petersburg, to build 50 miles of line to serve 150 customers in Mason County.

Oklahoma—$150,000 to Southwest Rural Elec. Coop., Tipton, to build 323 miles of line to serve 889 customers.

Texas—$100,000 to Coleman County Rural Elec. Coop., Coleman, to build 412 miles of line to serve 850 customers.

Texas—$100,000 to the Kaufman County Rural Elec. Assn., Kaufman, to build 95 miles of line to serve 287 customers.

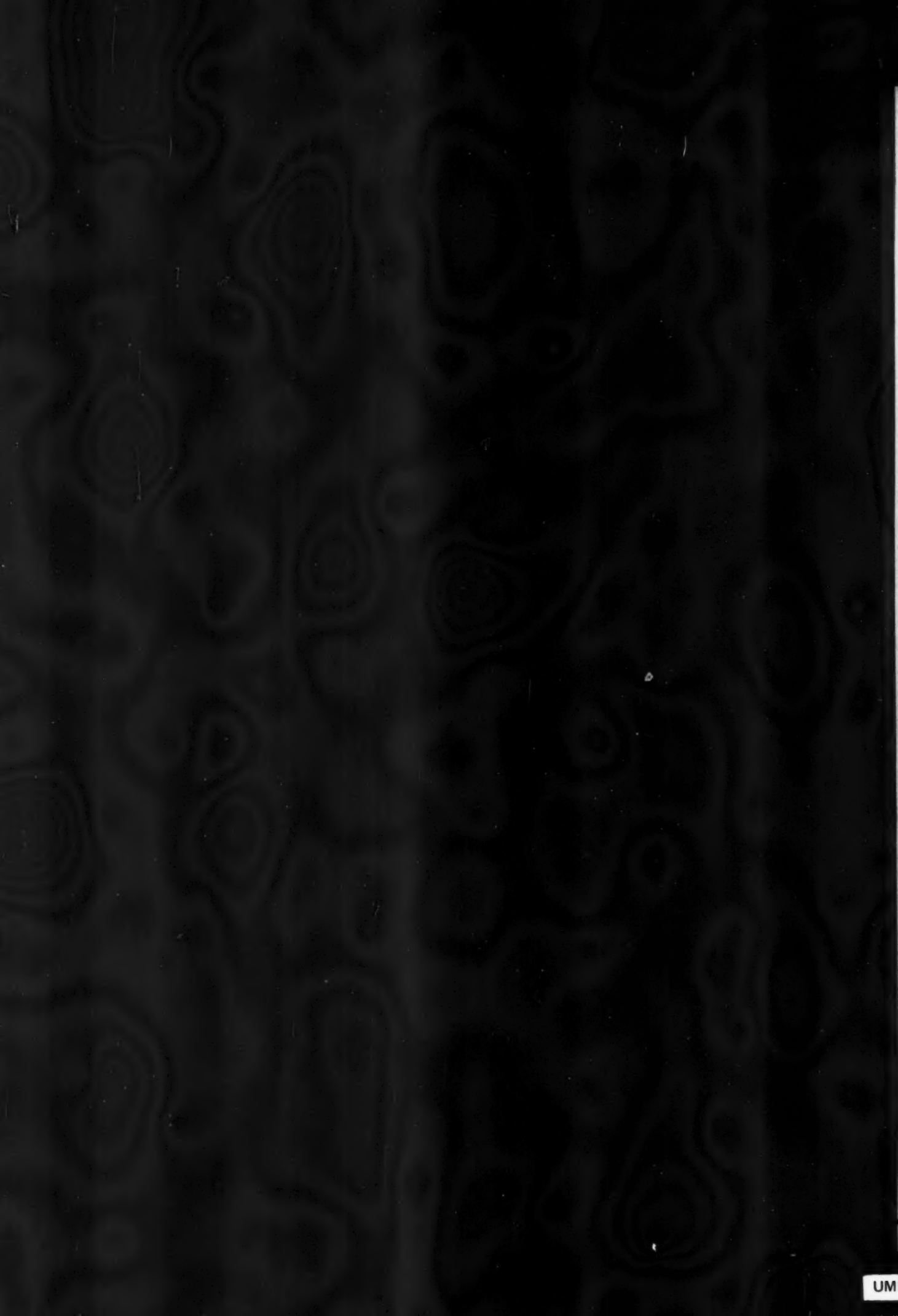
North Carolina—$61,000 to the Pamlico Ice & Light Co., Engelhard, to build 65 miles of line to serve 144 customers.

Ohio—$100,000 to a cooperative to be formed, Greenwich, to build 236 miles of line to serve 820 customers.

MODEL STATE LAW BACKED BY FIRE COUNCIL

At a recent meeting in Chicago, the Agricultural Committee of the National Fire Waste Council adopted a resolution recommending a model state electrical inspection law, recently drafted. This model law, patterned after the Michigan and California statutes, was prepared by a special N.F.P.A. committee, headed by L. P. Dendel, Secretary of the State Association of Mutual Insurance Companies of Lansing, Mich. It provides for setting up a state administrative board of five mem-

MODEL LAW SPONSOR—L. P. Dendel whose special N.F.P.A. committee drafted Model State Inspection Law.



Send for these NEW DATA

This recent literature, issued by leading electrical manufacturers, has been listed by number for your convenience. Please check on the post card any of this material you would like to receive. It will come to you without cost or obligation.

PRECISION RESISTORS

1. Bulletin No. 108 illustrating and describing two types of precision resistors for voltmeter multipliers, laboratory equipment, radio and electrical test sets and similar use. Tabular listing of stock sizes and handy engineering data. Ohmite Manufacturing Co.

ELECTRIC FURNACES

2. Bulletin GEA-2790 gives information on electric furnaces for scale-free hardening, conveyor type, for use with protective atmosphere. Information on loading, temperature control and equipment for supplying protective atmosphere. General Electric Co.

CURRENT CONTROL

3. A book entitled "What is Single Current Control?" written for the purpose of answering this question and showing how single current control is used. Harnischfeger Corporation.

STRIP HEATERS

4. Leaflet 30-TE describes and features electric strip heaters, for low and high temperature, high voltage circuits. Also urn heaters, immersion heaters. Lists, specifications and price list included. Harold E. Trent Company.

FEEDER DISTRIBUTION SYSTEMS

5. A 36 page Bulletin 165, describing and illustrating the three feeder distribution systems—Buss-Wa, Flex-a-Power and Trolley-Closur. Trumbull Electric Mfg. Co.

FLOODLIGHTING PROJECTORS

6. Catalog No. 211 featuring many types of floodlighting equipment and giving dimensions and specifications on each type, with illustrations. The Pyle-National Company.

HANDBOOK ON ALLOYS

7. A handbook of information and data on alloys for all users of wire, rod and strip in the electrical, chemical and mechanical fields. Lists description, application, price per pound of alloys, wire data, range of uses, current temperature characteristics of wire, resistance and feet per pound. Alloy Metal Wire Company.

TIME SWITCHES

8. Catalog sheet on Mark-Time switches for industrial built-in applications, wall switches and vacuum tube switches. Also portable switches, Mark-Timers, coin meter and photographic switch. Gives description, illustration and price list. M. H. Rhodes, Inc.

LIGHTING

9. Catalog No. 4 featuring line of recessed and special lighting fixtures. Includes flush recessed, semi-flush recessed, recessed, surface mounted ceiling, wall bracket, window display reflector, glass display case, cove, footlight trough, utility surface, and many other types. Kent Metal Manufacturing Co.

FUSES

10. Bulletin No. 1207 describing Robot "floating power" fuse for protection and Robot "overcurrent" SOS fuses to signal excess current consumption, overloads and danger-loads of motors. Lists specifications and price list. Champion Electric Fuse Company.

LIGHTING FIXTURES

11. Bulletin 8000 featuring Ster-Lite Fixtures, semi-recessed and surface mounting types. Illustrations of units and installations. Reflector & Illuminating Co.

VERTICAL MOTORS

12. A folder describing vertical hollow and solid shaft polyphase, ball-bearing, squirrel-cage, induction motors. Bulletin 1410. Fairbanks, Morse & Co.

SIGN TRANSFORMER

13. Bulletin 371-LT featuring the newly designed series of transformers for use with luminous tube (Neon) indoor signs and

NO POSTAGE NEEDED

"Knowledge is power." Know the developments in your field. Circle the numbers of the items you want on reverse side of this card and mail today.

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 64, SEC. 510 P. L. & R. NEW YORK, N. Y.

ELECTRICAL CONTRACTING

330 West 42nd Street

30th Floor **New York, N. Y.**

illumination. Jefferson Electric Company.

CONNECTING DEVICES

14. A folder illustrating and describing the Hubbellock polarized connecting devices—sealed connectors for portable electrical equipment. Also includes a list of applications. Bryant Electric Company.

DISTRIBUTION CAPACITORS

15. Folder GEA-2561A illustrating and describing pyranol distribution capacitors, individual pole-type units, Class ID units for 2300-, 4000-, 6900-, and 11,950-gr-Y-volt circuits. General Electric Company.

MAGNET SPEAKERS

16. Catalog 937, describing in detail new line of permanent magnet speakers. Many illustrations included together with graphs showing frequency response curves and tables. Of interest to engineers, sound men and radio servicemen. Cinaudagraph Corporation.

MULTI-BREAKER

17. A folder describing and illustrating Nofuse load center for homes, apartments and small commercial establishments. Also includes layouts. The Bryant Electric Company.

PORCELAIN

18. Bulletin No. 11 featuring the standard dry process porcelain. Also a bulletin showing one-piece high tension porcelain insulators. Illinois Electric Porcelain Co.

NICKEL ALLOY STEEL

19. A bulletin entitled "Nickel Alloy Steels for Hand Tools." Gives a history of this metal and a discussion of specific applications to be used as a guide. The International Nickel Company, Inc.

ELECTRIC TOOLS

20. A folder listing portable electric drills, hammers, grinders, buffers, groovers, drill stands and radial arms. Includes specifications and price list. Wodack Electric Tool Corporation.

OIL FUSE CUTOUTS

21. GEA-732F illustrates and describes the metal-enclosed construction and high interrupting capacity of oil fuse cutouts, particularly suitable for use where all live parts must be enclosed. General Electric Company.

INDIRECT LIGHTING

22. A folder featuring "Louvre Lens" for indirect lighting, for recessed and semi-recessed lighting. Illustrations and details included. Edwin F. Guth Co.

PYRANOL TRANSFORMERS

23. A booklet describing Standard pyranol cooled transformers built to AIEE and NEMA specifications. Includes illustrations, details, prices and specifications. The Standard Transformer Co.

SYNCHRONOUS MOTORS

24. A folder covering G-E synchronous motors for driving metal-rolling mills built for long and reliable service. Lists advantages, and includes many illustrations. GEA-1195B. General Electric Company.

STEAM PUMPS

25. Bulletin 6285 featuring duplex steam pump with eight-cover, side-pot type, fluid end and improved piston valve steam end. For industrial and oil fuel boiler feed service. Gives features, dimensions, sizes and ratings. Fairbanks, Morse & Co.

CAPACITORS

26. Catalog No. 142 describing and illustrating, in detail, the various mounting and constructional features of C-D box-type capacitors for correction of low power factor in industrial plants. Written for maintenance and power engineers as well as plant executives for use in planning the installation of capacitors in crowded quarters. Cornell-Dubilier Electric Corporation.

LIGHTING EQUIPMENT

27. Catalog illustrating and describing a varied line of lighting equipment. Includes sections on illumination design data, industrial, flood-lighting and commercial lighting equipment. Prices also given. Bright Light Reflector Co., Inc.

PORCELAIN

28. A brochure entitled "Restoring Service After the Flood". Gives experience from the flood in the Ohio River Valley last year, with case reports on electrical installations with knob and tube wiring. Many illustrations. Porcelain Products, Inc.

HEAT

29. A 48-page book entitled "Heat", tells the dramatic story of man's age-old struggle to control nature's most powerful force. Divided into five chapters on history of heat, definition of heat, accomplishments in heat conservation, describing materials available and specific uses. Many charts, photographs and drawings included. Johns-Manville.

WINDER DRIVES

30. Bulletin GEA-1745-A describing and illustrating adjustable-voltage winder drives with automatic tension control. Lists advantages and characteristics. General Electric Company.

AIR-CONDITIONING UNIT

31. A small folder describing "Perfectaire", a cooling unit combined with a lighting fixture. All units furnished complete with wiring, ready for installation. Operation control by side wall switch. Exhaust Fan & Blower Company.

FIBRE CONDUIT

32. Bulletin describing the Bermico line of fibre conduit. Covers process of manufacture, physical characteristics and diversity of application, details of conduit joints, couplings, multiple conduit, bends, etc. Brown Company.

CIRCLE NUMBERS - SIGN - AND MAIL

ELECTRICAL CONTRACTING — **JANUARY** (Not good after March 1)

Please send me, without obligation, manufacturers' literature herein described and identified by numbers circled below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

NAME..... TITLE.....
Please Print

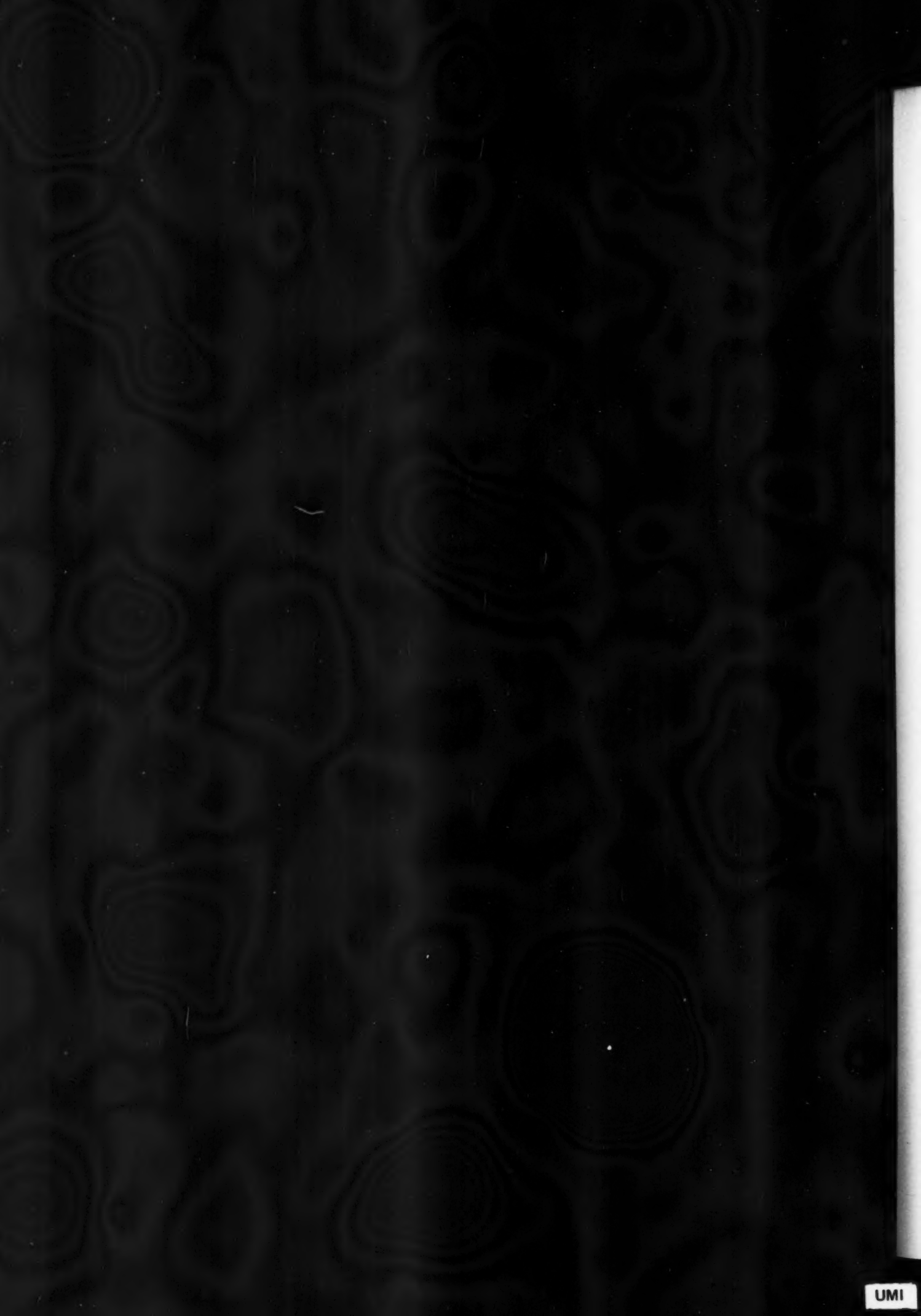
COMPANY .....
Please Print

ADDRESS .....
Please Print

CITY .....

STATE .....

Please Check	
Electrical Contractor	
Contractor and Motor Repair	
Industrial Plant	
Other (Indicate)	



bers, the necessary administrative officials, a contractor's licensing system and alternative amendments to provide for journeyman licensing.

Inspector qualifications call for at least ten years experience as an inspector or in the installation of electrical wiring and equipment. The contractor's licenses are divided into two classes. Class I would permit operations in any part of the state, Class II applies to contractors who employ no journeymen and who do no wiring in a municipality where electrical inspection has been established by ordinance. The recommendation is expected to give additional strength to activities in the farm states for protective electrical legislation.

ABBOTT HANDBOOK READY

The National Electrical Code Handbook by Arthur L. Abbott is off the press. It provides readers with a ready grasp of the New Code. This Fourth Edition is based on the 1937 Code, and follows a 6-chapter grouping plan for discussing its provisions. These six parts or divisions, are illustrated with diagrams, sketches or photographs that provide a clear explanation for many of the more complex rules.

Under the grouping plan adopted, the Code provisions appear as follows—Part 1, Definitions of terms used in the Code; Part II, Rules specifying what types of wiring are approved under given conditions; Part III, Installation of materials and apparatus; Part V, General requirements applying to all wiring systems; Part V, Special cases where special requirements must be applied; and Part VI, Construction of materials and tables.

While the new handbook does not follow the exact sequence of chapters as they appear in the Code, the author's arrangement of rules is intended to enhance the value of his handbook as a reference medium for those seeking a comprehensive grasp of the Code requirements. (National Electrical Code Handbook, Fourth Edition, by Arthur L. Abbott, 561 pages, $3.00, McGraw-Hill Book Company, Inc., New York, N. Y.)

RURAL INSPECTION FOR NEBRASKA

A tentative organization for handling rural wiring inspections has been set up in Nebraska by State Fire Marshal Horace Davis, subject to approval by Governor Cochran. This action was taken after representatives of some 20 rural electrification districts asked that inspection be organized.

Charles Horham of Lincoln, former inspector for the Lincoln fire department, will be in charge of the activity, and Henry Mockenhaupt, a regular inspector

In the News

[FROM PAGE 77]

for the fire marshal will be transferred to the rural electrification inspection force. An inspection fee of $3.50 will be charged, the inspector to receive $2.50 per inspection, and pay his own expenses. The other $1 is to go for administration. Rural electrification officials expect that 7,000 farms will be wired for service in Nebraska within the coming year. The department of vocational education is conducting a school in Lincoln on electric wiring and inspection.

COMING MEETINGS

National Warm Air Heating and Air Conditioning Association—New York City, January 24-26, 1938

American Institute of Electrical Engineers—New York City, January 24-28

International Heating and Ventilating Exposition—New York City, January 24-28

Wisconsin State Electrical Contractors' Association—Lorrain Hotel, Madison, Wisconsin, February 6, 7, and 8

National Electrical Manufacturers Association—Waldorf-Astoria, New York City, February 7-11

Minnesota Electrical Council—Minneapolis, Minn., February 14 to 17th inc.

W. CREIGHTON PEET DIES

William Creighton Peet, pioneer electrical contractor and past president of NECA, died at his home in Rye, N. Y. on November 27. He founded, in 1908, the well-known New York City firm of Peet & Powers, Inc., from which he retired in 1933. Death came in his 66th year.

Born in New Orleans, La., Mr. Peet attended M. I. T. at Boston, and completed his electrical engineering courses abroad in 1895. After engaging in electrical construction and engineering work in Germany, he returned to the United States to do experimental and development work for the American Telephone and Telegraph Co. Later he became associated with the George A. Williams Co. of Jersey City, then in 1902 entered into an electrical contracting partnership out of which grew the Peet & Powers firm.

Mr. Peet was elected president of the National Association of Electrical Contractors and Dealers in 1918. He served various posts in the New York City association.

W. CREIGHTON PEET—long prominent among New York contractors.

JOHN M. SKIDD DIES

John M. Skidd, 69, a veteran electrical contractor and dealer, of Chatham, N.B., died at his home there recently, after an illness of six weeks. He had been in the electrical wiring and fixture business for 46 years. In the course of his 36 years as a contractor, he had executed contracts in various sections of northern New Brunswick and eastern Quebec, including some government buildings, hotels, factories, hospitals, etc.

T. H. DAY DEAD

Thomas Henry Day, one of the organizers of the International Association of Electrical Inspectors, died on December 6 at his home in West Hartford, Conn. He was 76. Mr. Day had been an electrical engineer of the New England Insurance Exchange and previously with the Hartford Board of Underwriters. He had served on the electrical committee of N. F. P. A. and on special committees of the Bureau of Standards.

PORTLAND CODE PROVIDES FOR ADEQUACY

The Portland, Ore., electrical code, which Chief Electrical Inspector L. W. Going has been busy re-writing, will have some notable provisions relative to greater adequacy in wiring. One of them refers in particular to initial circuit loads for commercial and industrial occupancies. The revised Code proposes to restrict initial loading per circuit to two-thirds the maximum rating. This will necessitate the installation of a greater number of branch circuits at the start and so make way for future load additions with safety. It is expected to have the new Code completed in time to be approved and put into force about the first of the year.

LIMITED LICENSE IN MICHIGAN

Changes in the Michigan state license law, to become effective in January, will include provisions for a special journeyman's license. Electricians will be eligible when their work is limited to servicing electrical equipment and installing wiring in connection with special equipment, such as signal systems, heating, factory maintenance and fixture installations.

NEW YORK SCALE TO $2

After January 1 the wage scale for IBEW electrical workers in all New York borough reached a new high of $2 per hour for a five-day thirty-hour week. This is a 25 per cent pay increase, which was recently signed with borough contractor associations. The new scale affects about 4,700 workers of local union No. 3.

Considerable interest centers about a reported assessment of 10 cents per hour which is being collected to replenish the union's treasury. It is held in some quarters, but denied by union officials, that this assessment is to create a war chest or defense fund. An injunction suit is now being heard in court, which was brought against Local 3 by NEMA and fourteen electrical manufacturers, which charged the union with violation of the Sherman Anti-Trust Act. Low dues of $16 per quarter were said to necessitate the 10 per cent assessments.

ELECTRICAL LIVING CONTEST A BIG SUCCESS—PHASE 2 FOLLOWS

General Electric Company's national contest on the "Electrical Standard of Living" has completed its first phase. This was the letter contest in which electric consumers all over the country were invited to write a letter on the fun and economies of the electrical way of living.

Some 365 power companies, from coast to coast, mailed contest blanks to more than 14,000,000 homes. This folder told the story of modern electricity in the home and gave the basis for entering the contest. More than 300,000 people have entered the contest, in which two complete electrified homes and ten prizes of $200 worth of electrical appliances will be awarded. This contest closed on December 4.

In the second part of the program, now starting, power companies will sponsor local contests in which people will enter their own homes as examples of the electrical standard of living. This contest will close on Oct. 31, 1938. It provides for awarding prizes to homes embodying the best utilization of these ten specifications that encompass good home building:

1. Good location and architecture. 2. Sound construction and skilled labor. 3. Quality materials and equipment. 4. Landscaping and interior decoration. 5. Sound financing. 6. New materials. 7. Plumbing and sanitation. 8. Heating and air conditioning. 9. Insulation and sound-deadening. 10. Electrification.

The first five points cover the basic requirements of sound "shelter"; the second five cover the more recent developments which transform mere shelter into better living. Emphasis is laid on Point No. 10—"Electrification." The main feature of this program is a folder entitled "Two-Fisted Home Building Activity," which General Electric Company will furnish imprinted with the name of the local sponsor and his prize awards.

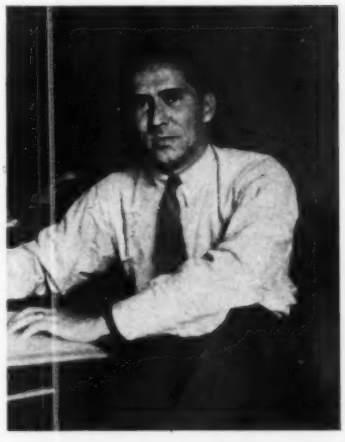
Local power companies will arrange the local contests and set up such prizes as they may desire. It is expected also that other manufacturers of electrical equipment and of other materials such as roofing and plumbing equipment will also offer additional prizes, if the winning house embodies this product.

Concurrently General Electric will conduct a national home building contest based on the same ten point specifications in which $20,000 in prizes will be offered. It is expected that the greater number of the power companies that cooperated in the initial letter contest will follow through with the home building contest, and that a wide spread promotion for the electrical standard of living will result. The slogan of these campaigns will be—"Don't Build an Obsolete House!"

NORTHERN CALIFORNIANS MET AT SAN MATEO

A wide range of important contractor topics were discussed by the Electrical Contractors Association of Northern California, at San Mateo on December 4. Local and out-of-town speakers talked on: billing for labor, manufacturer sales agreements, the use of laws for stabilizing competition, the 1937 Code, and the value of pricing guides.

Lloyd Flatland, Globe Electric Works, San Francisco, proposed a committee to develop a program for mass production of residence rewiring. A. L. Stone of Los Angeles, outlined the NECA program for industry coordination, a fair trading policy, voluntary codes, and other functions.



YOUNG BLOOD—The well known firm of H. B. Frazer & Co. in Philadelphia does an interesting class of industrial and commercial work, one specialty being large bakery and ice cream plants. This is a field where young engineers can find much to do, so we find W. E. Frazer very much on the job assisting his father. When Ed graduated from Penn State and joined the company, he brought along a fellow-grad who had majored in electro-chemical engineering. Which provides an array of young engineering blood to handle many of the knotty problems in the modern industrial field.

Herbert Evans, of the Southern California chapter described the bidding form used in connection with the voluntary code in Los Angeles. Clyde L. Chamblin, past president of NECA was nominated and recommended to the members as the labor relations committee representative from Division 9.

New officers elected: president, J. Del O'Connor, Sacramento; vice-president, Kenneth Ryals, San Francisco; and secretary-treasurer, Wm. A. Cyr, Pacific Coast editor of Electrical Contracting. Hosts to the convention were the San Mateo County Electrical Contractors Association.

1937 LAMP SALES SET NEW VOLUME RECORDS

More than a half billion large incandescent lamps were sold in the United States during 1937. A total of 955,000,000 is indicated for both large and miniature lamps—515,000,000 large and 440,000,000 miniature. Each of the totals is the highest yet attained.

BUREAU OF STANDARDS CITES FUSE HAZARDS

Bridged or improperly substituted plug fuses are cited as the probable cause of 130 instances of preventable fires and eight fatalities. The charge is made in a paper prepared by Morton G. Lloyd, Chief of Safety Standards Section, Bureau of Standards for publication in the proceedings of I.A.E.I. It deals only with the plug fuse and attention is called to the new non-tamperable plug fuse that is recommended by the 1937 edition of the National Electrical Code.

NEW SAN JOAQUIN ASSOCIATION

A new association of Electrical Contractors and Dealers has been organized in San Joaquin County, Calif., with Grover Grider, electrical contractor of Stockton as president. R. Goold is secretary, and Frank E. Rea as business manager. An official bid depository is established in the Bank of America Building where duplicates of bids are placed on file.

OKLAHOMANS DISCUSS RURAL COMPETITION

Twenty-three county electrical contractors and appliance dealers met recently with rural electrification officials in Blackwell, Okla. They completed a working agreement between themselves and the proposed farmers' wiring cooperative. The purpose of the organization is to speed up wiring contracts in rural homes so that the rural electrification project can be completed on schedule. The contractors agreed to work with the cooperative and the cooperative agreed not to set up practices of unfair competition in the wiring field.

Nails for Rustics

After carefully installing wrought fixtures in a fine Wilmington, Del., residence, Hatzel & Buehler, Inc., got orders from owner and architect to re-hang them more in keeping with the rustic motif. This required the use of large pre-rusted wrought nails, driven in part way and then bent over on the plastered surface in a grotesque and conspicuous manner. Anything to please the discriminating customer, says J. M. Alexander.

RUN OF MINE—Nice job, eh! But W. A. Landry, manager of the Montreal Armature Works, Ltd., considers this 300 hp., 400 r.p.m. 2,300 v. stator just a matter of routine. Canadian mill customers use power in large units, so Mr. Landry's shop is equipped to handle these big fellows with ease.

Peak Pick Ups

A recent issue of Western Electric's smart broadcasting organ "Pick-Ups" presents a photographic series devoted to KFJB of Marshalltown, "Central Iowa's Own Station." Just in case you don't already know it, E. N. Peak, president of NECA, is president of KFJB, and Wayne Peak is chief engineer of this station.

Control Needed

Motor Shop operators can do some profitable work by checking their production records, says Paul Keating of the Electrical Installation Co., in Cambridge, Mass. Just now this company is going over records covering a maze of standard rewind jobs to find out the average amounts of material and labor required. These findings will bring about closer control of wasted material, place shop operations on a definite time schedule, and provide more accurate cost data for use on other jobs that come along.

Telling the Town

The Brown Electric Co. has been going places at Little Rock, Ark. in the way of motor repairs. So much so that W. M. Brown blossoms forth with large newspaper ads. He speaks of serving the south and doing business in eight states, also of having re-arranged and enlarged his shop until it is offered as one of the largest in the south.

Gas Runs High

Estimators of rural transmission lines should give care to their allowances for gasoline to operate trucks and superintendent's autos. One large contractor reports a rural job where $600 was estimated and the total gasoline bill was more than $2500.

Keep Your Contact

C. M. Davis of Harrisburg, Pa., is one veteran electrical contractor who has little patience with association "disbanders." Claiming no spectacular results for his city, he points with pride to a continuous record of his local contractor organization through the past lean years. All representative firms come out to meet with their fellow competitors—and that is something.

Sacred Cow Begone

The Youngstown, Ohio contractors have plugged so long and so hard for better wiring that anyone now using less than No. 12 for branch circuits is just about in the dog house, according to E. C. Carlson. Good work!

***LABOR TURNOVER** is a prime factor in keeping customer confidence, says President C. W. Finley of the Central Electric Co. of Battle Creek, Mich., showing a record of many employees over 20 years with the company. Starting back in 1903 with two men, this house has grown to include electrical contracting, retailing, wholesaling, motor repair and appliance sales and employs nearly 100 people. They specialize in power plant and transmission work, and also have an illumination engineer devoting full time to lighting installations.*

SUCCESSFUL SHOWS—require a lot of work from the men in charge, so the success of the recent Electrical Maintenance Engineers Annual Show in Chicago was largely due the efforts of these men, Major A. A. Gray of the sponsoring Electric Association, (left) President J. J. McKenna and Tom E. Hayes of the Electrical Maintenance Engineers.

Heating Tie-Up

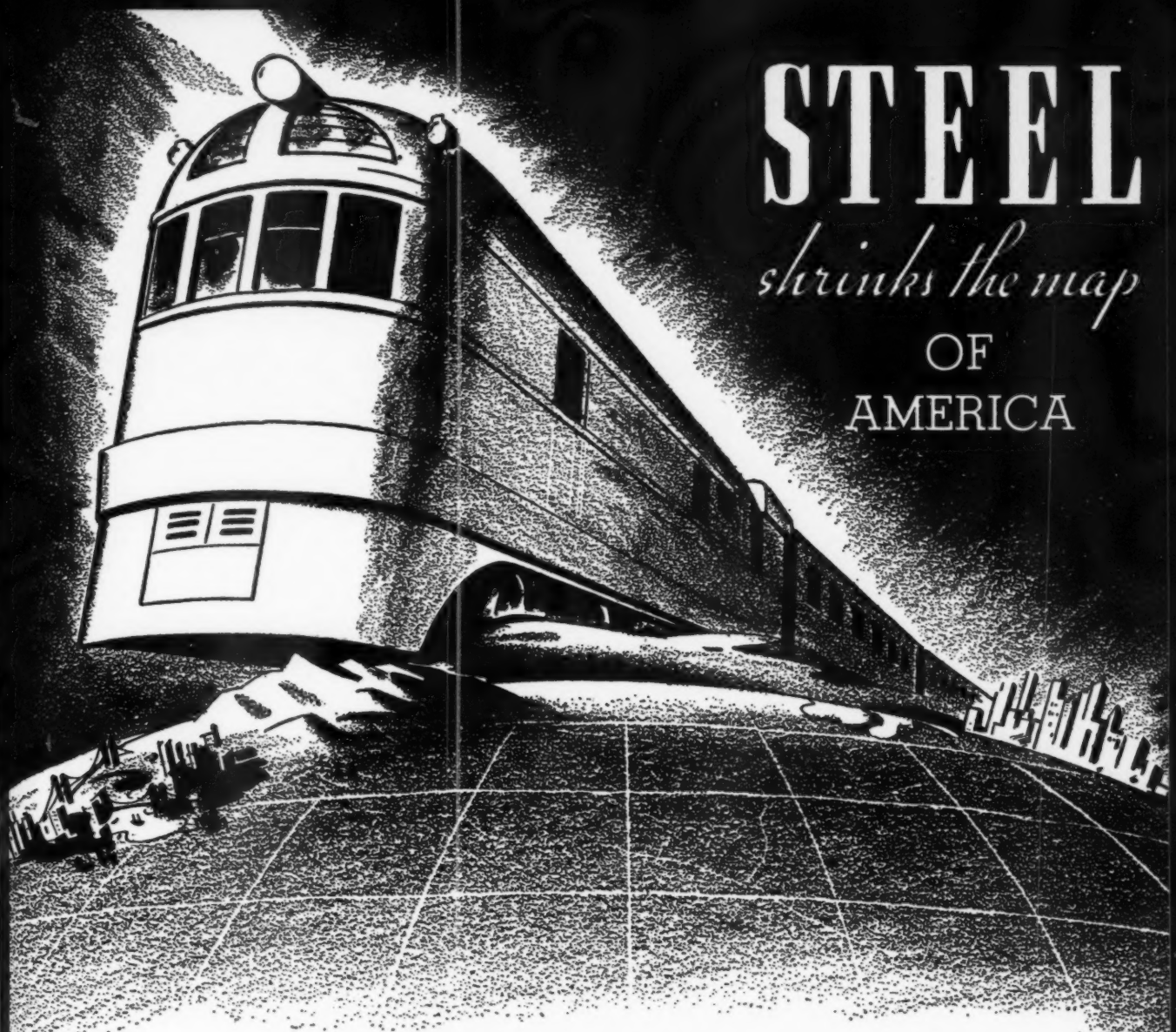
A new activity has been successfully developed in St. John, N. B. by the Vaughan Electrical Co., that keeps two and three jobs in progress most of the time. By working in close cooperation with a selected group of heating contractors, their joint sales efforts have brought in some good orders for converters and circulators for coal-fired heating plants in larger public and private buildings. Now Frank E. Vaughan, who heads this 35-year company, has mapped out a campaign with his group of heating specialists to cut the cost of coal for owners of homes, hotels, lodging houses and the like. Victor Vaughan, a brother, assists in the technical work involved in making these installations.

More Range Wiring

Last year Minneapolis contractors set themselves a new high for range wiring. Forty per cent of all the new homes built in that area were equipped for ranges. And that isn't all. William A. Ritt, Secretary-Manager of the Minnesota Electrical Council predicts that an average of 60 per cent of new homes to be built in 1938 will be wired for ranges.

Votes by Volume

Members of the Electrical Contractors Association of Greater Boston, Inc. are entitled to voting power in proportion to gross volume of business transacted during the preceding year within the territorial limits of the association. While each firm has at least one vote, additional votes are determined on the basis of one vote being allotted for each $10,000 in business transacted. No fractional votes are counted and no member can have voting power in excess of one-third the total voting power of the association.



STEEL

shrinks the map OF AMERICA

Philadelphia used to be two days from New York. Now *steel* makes it in two hours.....You can live in healthful suburbs yet work in the city, because your steel automobile makes minutes out of miles .... You can do business with the nation and the world -- instead of only a few neighbors -- because of steel machinery and transport. Because it constantly conquers distance and discomforts, *steel* makes America the most compact and progressive continent in the world.

Because steel is so definitely part of our modern life, we take it too much for granted. Do you realize that there are not scores, not hundreds but thousands of kinds of steel? Each has a certain purpose or product for which it is best suited. Here at Youngstown, when we receive an order for steel -- no matter how small nor how routine the use -- we will not begin that order until we are certain we have exactly the right steel for the purpose.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices YOUNGSTOWN OHIO

QUALITY YOUNGSTOWN SERVICE

YOUNGSTOWN

Sheets · Plates · Pipe and Tubular Products · Conduit · Tin Plate · Bars · Rods · Wire · Nails · Unions · Tie Plates and Spikes

25-4A

About NECA

ADEQUATE WIRING PROGRESS

The National Adequate Wiring Bureau, on which NECA is represented by S. J. O'Brien, New York, and E. G. May, Albany, has appointed a Publicity Committee to develop plans for rapid and wide promotion of the adequate wiring program through all branches of the industry. This special committee is composed of Herbert Metz, Chairman of the Plan Committee, Laurence W. Davis, NECA, Alfred Byers, NEWA, O. C. Small, NEMA, and C. E. Greenwood, EEI.

The Adequate Wiring Plan Book, certification plan, direct-mail promotional material, advertising mats, sound-slide films and other features of the National Adequate Wiring program are rapidly being completed ready for production. Announcement of the full program will be released by the Bureau at an early date.

PEAK HONORED IN MARSHALLTOWN

Earl N. Peak was the hero at a testimonial dinner at the Tallcorn Hotel, Marshalltown, Iowa, on December 10th, in honor of his re-election as president of National Electrical Contractors Association. The party was sponsored by his home town Chamber of Commerce.

More than 150 of Mr. Peak's friends—fellow-townsmen, mayors and citizens from other towns in Iowa and surrounding states, and notables from distant points—attended this dinner as a tribute to the man they all know as "Earl." Telegrams and greetings were read from a large number of others unable to be present.

C. H. Kemler, president of the Marshalltown Chamber of Commerce, gave the opening address at the banquet, with "Larry" Davis, general manager of NECA, acting as toastmaster. Herbert Metz, Graybar Electric Co., New York, presented a resume of Mr. Peak's contributions to the electrical industry's welfare and leadership in industry cooperation. Before calling upon Mr. Peak for a response, President Kemler presented him with a handsome gift from their Chamber of Commerce.

LABOR RELATIONS COMMITTEE POLL

A nomination ballot has been sent to each member of NECA on which he is requested to nominate a member from his Division to serve on a labor relations committee. This committee will undertake to encourage better relations between employer and employee.

All nominations for members of this Labor Relations Committee must be in the national office by January 11, 1938. The three members in each division receiving the largest number of nominating votes will then be placed on the official election ballot for final poll, and the one nominee in each division in that poll receiving the greatest number of votes will be elected as a member of this special committee.

The immediate duties of this Labor Relations committee are only to formulate a plan with reference to labor relations.

FIELD PLAN FOR SOUTHEASTERN DIVISION

The Southeastern Industrial Chapter, NECA, at its meeting held in Charlotte, No. Car., on December 3rd, will employ a field man in cooperation with the National Association. This man will serve the eight states comprising Division 5—Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama and Mississippi.

He will serve not only in building up National membership and establishing more Chapters in the Southeastern territory, but will cooperate with the NECA Distribution Committee in fostering fair trading practices in that area for NECA members. It is expected that this field representative will be ready to take up his activities soon after the first of the year. He will be selected from within the Division so that he will be well acquainted with the territory he is to serve. He will take a course of training in the National headquarters before taking up his duties.

PLANS FOR 1938 CONVENTION

The Book-Cadillac Hotel, in Detroit, has been selected for the 1938 NECA Convention to be held on September 12-13-14-15. General Manager Davis reports enthusiastically on the plans already outlined by the Detroit Chapter executives, who are acting as a convention committee.

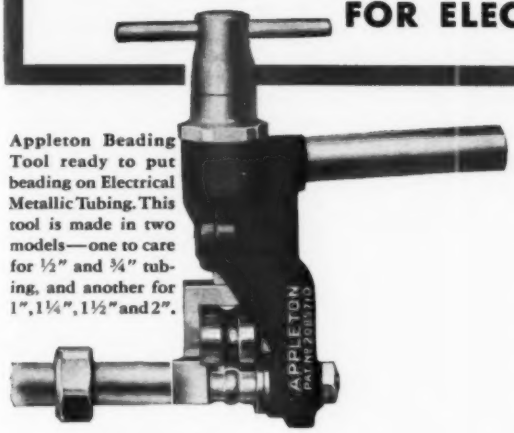
"Mr. Cadwallader's committee," he states, "have already laid out a program of entertainment to balance the four days business of the convention, which should make every electrical contractor want to attend this 1938 convention in Detroit, and take his wife. The Book-Cadillac is a splendid hotel with ideal facilities for a big convention. Detroit holds unique attractions for both ladies and men—the famous Ford "village," Dearborn Inn, beautiful drives through the residential districts and the Belle Island, Yacht Club, also visits to the great automobile plants through which hundreds of thousands of visitors are conducted each year. There are unsurpassed golf courses. A metropolitan shopping and theatre district lies near the hotel.

***EARL PEAK** receives the tribute of his neighbors at a testimonial dinner in Marshalltown. Larry Davis was imported as a big town toastmaster.*

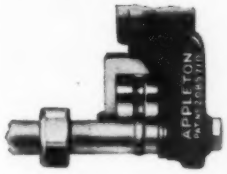
Material for this department is supplied by the headquarters staff of the National Electrical Contractors Association, 420 Lexington Avenue, New York.

NOW... A WATERTIGHT, PERMANENT JOINT

FOR ELECTRICAL METALLIC TUBING



Appleton Beading Tool ready to put beading on Electrical Metallic Tubing. This tool is made in two models—one to care for ½" and ¾" tubing, and another for 1", 1¼", 1½" and 2".



This illustrates beading on end of tubing. Note cap (or nut) must be put on tubing before bead is made.

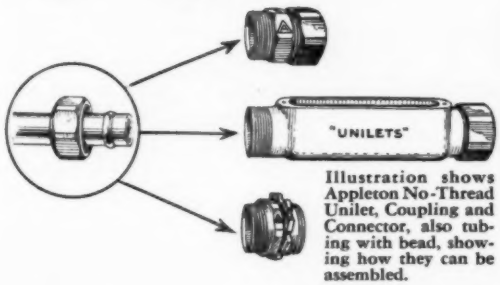
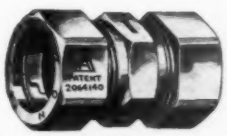


Illustration shows Appleton No-Thread Unilet, Coupling and Connector, also tubing with bead, showing how they can be assembled.



Regular Approved Watertight Coupling for use with Electrical Metallic Tubing.

Regular Approved Watertight Connector for use with Electrical Metallic Tubing.

USE NEW

APPLETON BEADING TOOL

(Patent No. 2085710)

● Here is a simple and convenient tool for insuring a permanent watertight joint with electrical metallic tubing. Tubing beaded by the Appleton Beading Tool is easily connected to Appleton No-Thread Unilets, Couplings and Connectors as designed for use with electrical metallic tubing. This beading insures a watertight job and a connection that is unaffected by vibration or severe operating conditions.

The tool is placed on the end of the tubing with the lower roller inside the tubing. Then, by turning the handle and revolving the tool around the conduit five or six times, a proper bead will be formed. By placing the end of this tubing into any conduit hub of an Appleton No-Thread Unilet, Connector or Coupling designed for electrical metallic tubing, by removing the gripping ring and tightening the nut, a most rigid and watertight connection is secured. *It will not pull out.*

NEW LOW PRICES

ON APPLETON CONNECTORS AND COUPLINGS

The prices on Appleton Connectors and Couplings have now been greatly reduced. Through years of experience Appleton has developed these all-purpose fittings, and due to unexcelled engineering and manufacturing facilities can now offer them at unusually attractive prices. Write for new price sheets.

Write for further information

APPLETON ELECTRIC COMPANY

1704 WELLINGTON AVENUE • CHICAGO, U. S. A.

NEW YORK—76 Ninth Avenue
SAN FRANCISCO—655 Minna Street
LOS ANGELES—340 Azusa Street
DETROIT—7310 Woodward Avenue
ST. LOUIS—420 Frisco Building
ATLANTA—203 Luckie St., N. W.
CLEVELAND—214 Hippodrome Bldg.

WITH THE *Manufacturers*

General Electric Promotions

Charles E. Wilson, vice-president in charge of General Electric's appliance and merchandise department since 1930, has been elected executive vice-president of the company, a new position just announced by President Gerard Swope.

F. A. Parnell has been appointed sales manager of the conduit and wire sales section at Bridgeport, Conn.

H. E. Merrill has been made advertising manager of the construction material sales division, succeeding Mr. Parnell. His headquarters will be at Bridgeport.

F. C. Dazley has been made sales manager and F. C. Ralph, commercial engineer of the construction materials division of Bridgeport. Mr. Ralph will also continue his responsibility in the electric range accessory field.

The G.E. wiring materials field organization has been divided into six national sales districts. The district managers will be E. G. Hall, Boston; F. D. Bedell, New York; R. R. Morgan, Dallas; L. F. Kummel, Cleveland, J. P. McIlhenny, Chicago; J. O. Dillingham, San Francisco.

J. W. Dunbar, formerly in charge of magazine advertising for the Incandescent Lamp Department of the General Electric Company at Nela Park, has been appointed assistant to C. H. Lang, Advertising manager. Mr. Dunbar's headquarters will be at 570 Lexington Avenue, New York.

CHARLES E. WILSON—becomes executive vice president of General Electric

F. A. PARNELL—now sales manager for General Electric conduit and wire.

•

Triangle Conduit & Cable Co., Inc., of New York announces that the states of Maryland, Virginia and the District of Columbia have been made a part of the Philadelphia territory under the direction of Harry C. Anschuetz, 117 N. 5th Street, Philadelphia.

The state of Colorado has become a part of the Chicago territory and is under the jurisdiction of George Butler Electric Sales Co., 552 West Adams Street, Chicago.

•

Lincoln Electric Company announced the opening of a new welding sales-engineering office at 412 Title Building, Atlanta, Ga. This office is under the management of Robert Daniels.

•

William H. Stangle will direct the recently announced Home Air Conditioning activities of the Westinghouse Electric & Manufacturing Company. Since joining Westinghouse a year ago, Mr. Stangle has been conducting an exhaustive survey of this market, the result of which Westinghouse is using as the basis for its entrance into the residential air conditioning field. Mr. Stangle's office is in Mansfield, Ohio.

Square D Personnel Changes

The following appointments have been announced by the Square D Company of Detroit. Walter H. Bodle has been made assistant to the sales manager, C. L. Hull. Mr. Bodle was formerly in charge of the Indianapolis Office.

R. W. Thompson will succeed Mr. Bodle in Indianapolis. He was previously branch manager of the Pittsburgh Office.

A. W. Anderson of the Pittsburgh office will be in charge of this territory, succeeding Mr. Thompson.

•

American Transformer Company has opened a new branch factory at 273-301 Emmet St., Newark, N. J., for the assembly of heavy industrial transformers. At the present time the building provides for the use of 16,000 square feet of manufacturing floor space. It will be possible to increase this floor space in the future to 64,000 square feet.

•

Indicator Corporation Changes

A. E. Carpenter has been elected president of the Indicator Corp., of Newark, N. J., succeeding F. A. Schiller, who resigned.

Edward A. Tunis was elected vice-president and general manager, in full charge of all operations of the company.

•

M. H. Corbin has been appointed to the Technical Sales Development Staff of the Standard Varnish Works of New York. He was formerly connected with the Arco Company.

•

The B-L Electric Manufacturing Company of St. Louis, Mo., has appointed the Heimann Company of Minneapolis as its representative in the states of Minnesota, Iowa, North and South Dakota and the Northern part of Wisconsin.

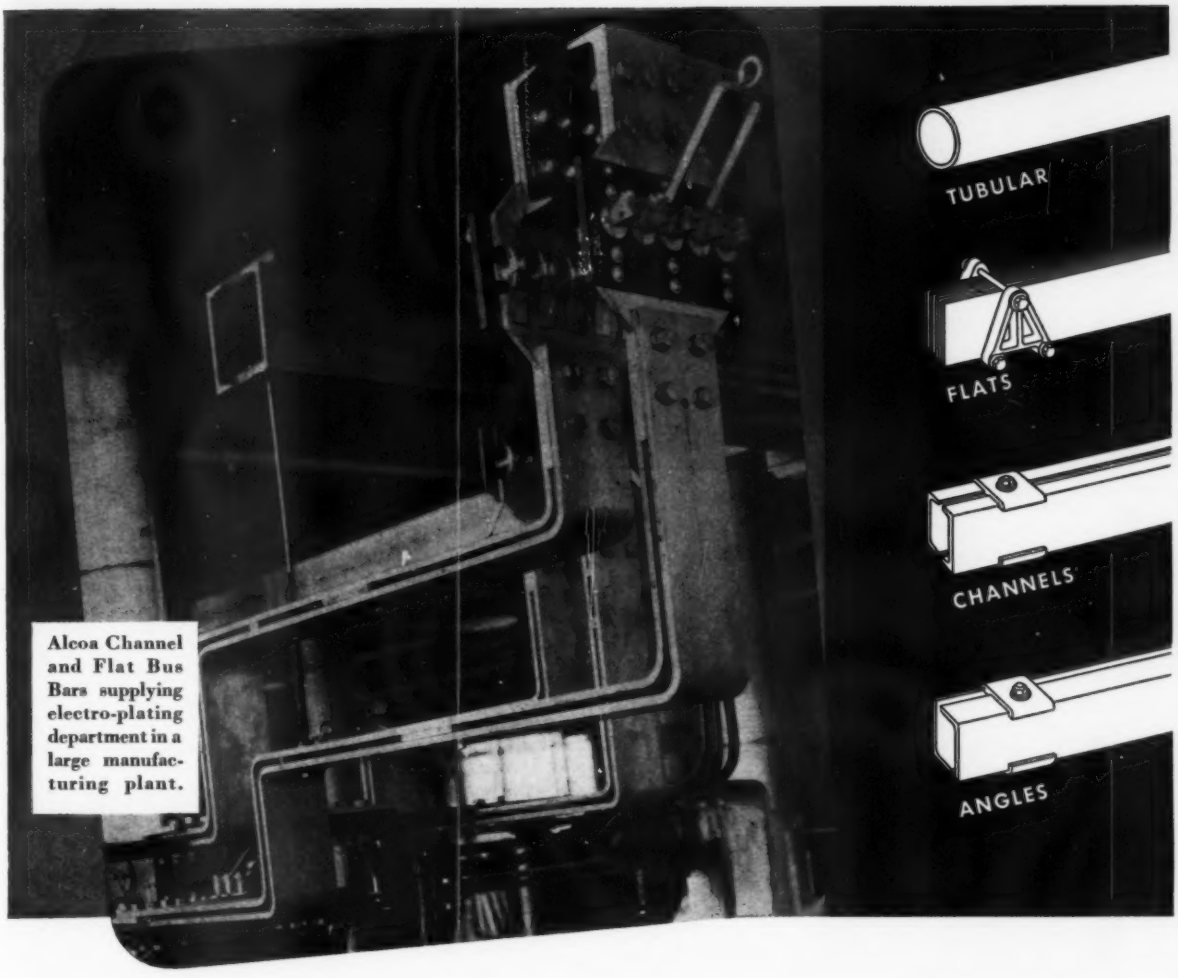
•

New Company Organized

The Wilson Fixture & Mfg. Co., Inc., has recently been organized to manufacture a general line of commercial lighting fixtures and allied products.

The engineering development and research work for the new company is being handled by the Wilson Electrical Development Company, which also acts in a similar capacity for Wilson Lighting, Inc., manufacturers of reflectors and floodlights.

Wesley Wilson is president of the new company, and the home office is located at 411 S. Clinton Street, Chicago, Ill.



Alcoa Channel and Flat Bus Bars supplying electro-plating department in a large manufacturing plant.

MEETING ALL OF YOUR REQUIREMENTS

Alcoa Aluminum Bus Bar

For heavy-current buses like the installation pictured above, for inside or outdoor substations, for power distribution in commercial buildings and factories; no matter what the character of the installation, there is an Alcoa Aluminum shape suitable for your use.

Extremely light in weight, Aluminum Bus Bars place a minimum strain on supporting structures. They are easy to handle in erecting. Readily formed, Aluminum buses can be tailored to suit each layout. Joints are made by bolting or welding. Fittings for every purpose are available; costs are low.

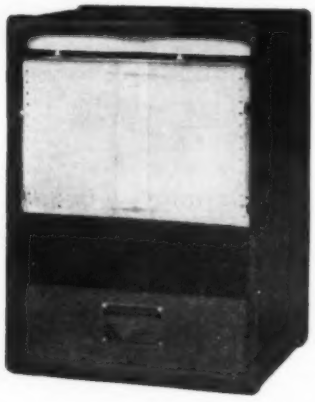
Alcoa Aluminum Bus Bar comes in any desired form: Flats, tubes, angles, channels, etc. Rolled channel or angle sections offer the highest combination of electrical, thermal and mechanical efficiency. We shall gladly send you data on each type. ALUMINUM COMPANY OF AMERICA, 2197 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

EQUIPMENT News

Photoelectric Recorder

This double photoelectric instrument will record simultaneously on one chart, two electrical quantities as low as one micro-ampere, full scale, and representing a power consumption of but 0.000,003,001-watt from a measured circuit. Can measure and record surface irregularities of steel strips; record outdoor and indoor temperatures for air-conditioning work, wet- and dry-bulb temperatures, refrigeration temperatures and other temperatures in heat-flow problems. Other applications are recording of high-resistance voltmeter-ammeter measurements, illumination measurements. General Electric Company, Schenectady, N. Y.

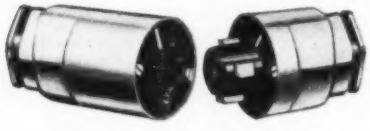


G.E. PHOTOELECTRIC RECORDER

■

Connecting Device

A new line of Bryant-Hubbellock polarized connecting devices has been developed, including a complete range of receptacles, caps and connectors for portable electrical equipment in industrial applications. The features are self-closing, positive locking, self-ejecting and non-arcing. Bryant Electric Company, Bridgeport, Conn.



BRYANT CAP AND CONNECTOR

FOSTORIA LAMP

Sewing Machine Lamp

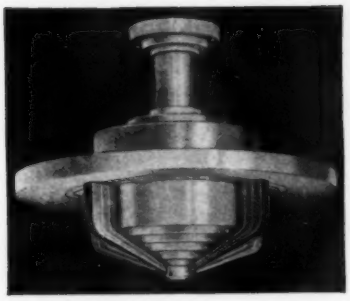
This Localite is for attachment to sewing machine tables. Horizontal arm is 22 inches long, mounted on cast iron base 14 inches high. Auxiliary arm is 5½ inches inches long. Overall length including reflector assembly is 33 1/4 inches. Equipped with standard cord and rubber plug. When used on 110-115-120-volt circuits a standard 25-watt 115 volt double contact candelabra bayonet base lamp is recommended. If use of 6-8 volt type of lamp is desired, a 15 candle power bayonet base lamp is used. Transformers are necessary in the 6-8 volt type of installation. Fostoria Pressed Steel Corporation, Fostoria, Ohio.

■

ERICSON PLUG CAP

Attachment Plug Cap

Safety plug cap No. 15-P will not break. Blades are held firmly and permanently in unbreakable insert. No rivets to loosen. Connections are inside where they are protected. Fibre cord grip ring for Type SJ cord, keeps tension off terminals, is easily placed on cord with pliers. Flexible shank. Made to fit all standard receptacles. Ericson Manufacturing Co., 5716 Euclid Ave., Cleveland, Ohio.



REFLECTOR STER-LITE FIXTURE

Surface-Mounting Fixtures

The surface-mounting Ster-Lite fixtures, developed for installation on finished plaster ceilings and under other conditions, where semi-recessed units are impractical. Through a combination of sterling silvered-glass reflectors and opal glass louvers, these fixtures afford intense illumination on working planes with diffused lighting of vertical surfaces. Made in one size for 300 to 500 watt lamps. Reflector & Illuminating Company, 1431 W. Hubbard St., Chicago.

■

CUTLER-HAMMER SWITCH

Fuseless Service Switch

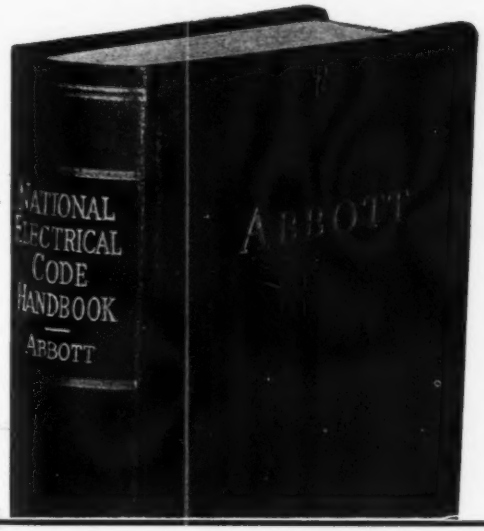
This 60-ampere fuseless main service switch, it is claimed, can be installed at practically the same cost as 30-ampere capacity devices. By eliminating main fuses, the principal source of injurious heat is avoided. Main switch is operated from outside the case, like toggle switches on home lighting circuits. Universal mounting permits installations in normal or inverted positions. Test holes in both range and branch circuit fuse blocks permit testing of all fuses without service interruptions. Available in either flush or surface mounting types. "Airstyled" enclosing case permits installations in kitchens, hallways or other convenient locations. Cutler-Hammer, Inc., 228 N. 12th St., Milwaukee, Wis.

Just Out!—New fourth Edition of Abbott's *National Electrical Code Handbook*

Convenient size, fully illustrated $3.00

The 1937 National Electrical Code is a new code
—entirely new in arrangement
—more than fifty per cent new in wording
—contains important new rules

Abbott's National Electrical Code Handbook, 4th edition, has been completely rewritten to correspond with the new 1937 Code.



—covering new 1937 Code

Use this book to get work done according to the Code. Gives rules and requirements for all jobs—what they mean—how to apply them. This big, detailed handbook gives every rule and requirement of the latest Code in practical, usable form, with explanations, diagrams, data and methods for applying them.

SAVE time and trouble in getting a command of these new features of the 1937 Code:

Branch Circuits—Now classified according to fuse rating or circuit breaker setting as 15-, 20-, 25-, 35- and 50-amp. circuits. House wiring circuits depend upon floor area, regardless of number of outlets. A reasonable number of receptacle outlets must be installed in every principal room.

Appliances—Five special types of circuits are specified. Feeders—Standard loads for some occupancies are considerably increased. For ranges of 3,500 watts or higher rating, new demand factors apply to the feeders.

Panelboards—An important change has been made in the requirement for overcurrent protection.

Services—There are new rules governing the number of sets of service entrance conductors to one building and number of the switches and fuses, or circuit breakers, for the control and protection of each service.

Motors—Rules formerly appearing in old Articles 8 and 10 are now consolidated in one article and so changed in wording and arrangement that they must be studied carefully to find what changes have been made.

Get to the root of these important changes, new rules and cautions, quickly, with Abbott's NATIONAL ELECTRICAL CODE HANDBOOK. Have this helpful explanation of all Code rules constantly at hand.

Valuable data for the electrician, inspector, contractor and architect

—definitions of the terms used in the Code
—types of wiring approved under given conditions
—requirements pertaining to standard materials and apparatus and to standard methods of installing such materials and apparatus
—general requirements applying to all wiring systems
—automatic overload protection, covered both in section on general requirements and in connection with specific applications
—simplified application of Code data pertaining to motor installations
—special requirements pertaining to outside work, hazardous locations, theater wiring, elevators, cranes, signs, radio equipment, etc.
—74 useful tables
—252 illustrations and schematic diagrams of apparatus and installations
—128 wiring and connecting diagrams
—big, clear type; readable set-up
—subject index and cross index, etc.

Send this McGraw-Hill on-approval coupon

McGRAW-HILL BOOK CO., Inc.,
330 W. 42nd St., New York City

Send me Abbott's National Electrical Code Handbook, 4th ed., for 10 days' examination, subject to approval or return. At the end of 10 days I agree to pay $3.00 plus a few cents for postage and delivery, or return the book postpaid. (We pay postage on orders accompanied by remittance.)

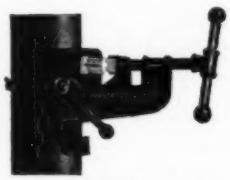
Name .....
Address .....
City and State .....
Position .....
Company EC-1-38
(Books sent on approval in U.S. and Canada only.)

EQUIPMENT News

[FROM PAGE 86]

Post Vise

This line of vises can be tightly locked to any column, pillar or post up to 10-in. in diameter for use on the job, in cellar, on farm or boat. Snap the chain, and turn the locking handle and the vise is set on post or column as though it were riveted in place. Frictionless cup takes up slack and makes locking and releasing of chain easy. Broad jaws of vise grip pipe tightly without digging or marring. Available in two types. No. 152 holds pipe from ⅛- to 2-in. and No. 163 pipe from ⅛-in. to 2½-in. Both models equipped with ¾-in. pipe bender. Armstrong Manufacturing Co., Bridgeport, Conn.



ARMSTRONG POST VISE

■

G-E PUSH-BUTTON STATION

Push-Button Station

A slap of the open hand on the "mushroom" head of this push-button station will suffice to stop a machine controlled by this device. Developed for use in bakeries and suitable for use on machines where it is necessary for operator to wear very heavy gloves or asbestos mittens. Mushroom head projects from front of button so operator can slap button when conditions require him to make a rapid, positive shutdown of machine. Mushroom head is screwed to metal insert in end of button. Station available without mushroom head and with insert undrilled so it can be used in applications which require an extended button of ordinary type. General Electric Co., Schenectady, N. Y.

Precision Resistor

A vacuum impregnated, non-inductive, pie-wound precision resistor of 1 per cent accuracy and 1 watt rating. Features hermetically sealed windings, with high heat transfer. Overall length, 2 inches and 9/16 inches diameter, equipped with studs and nuts as well as soldering lugs. Ohmite Manufacturing Company, 4835 W. Flournoy Street, Chicago,

OHMITE RESISTOR

■

Waterproofing Compound

Mason-Seal, a new weatherproof liquid compound for waterproofing cracked or porous masonry. Applied with a brush, it forms a weatherproof coating about 1/16-inch thick that will cover cracks up to 1/16-inch in brick, stucco or concrete. Prepared in ten colors and packed in all sizes. Calbar Paint & Varnish Company, 2612 N. Martha St., Philadelphia, Pa.

■

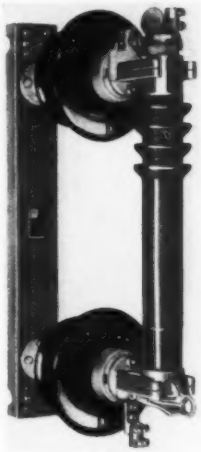
Loom Transformers

Warp-stop loom transformers are designed to meet requirements of textile industry. Available in special or standard units. Special units totally enclosed and compound filled. Fuse protection provided in series with secondary to protect transformer. It excludes dust, oil or moisture and reduces fire hazard to a minimum. Standard units are conventional air-cooled control transformer design with end cases to protect ends of coils. Rated at 25 volt-amperes, transformers have secondary voltage of 12 volts with primaries of 115, 230, 460 or 575 volts. Special ratings also available. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

WESTINGHOUSE WARP-STOP TRANSFORMERS

Power Fuse

Extra heavy duty type SM fuse for service where severe short circuits may be encountered. Suitable for indoor and outdoor service, 200 and 400 ampere ratings, for voltages from 5000 to 34,500 volts. Fusible element built into a re-fill unit and assembled with spring and cable in fuse holder. Fuse holder made of porcelain, easily removed and replaced with switch-stick for inspection or renewal of re-fill units. Schweitzer & Conrad, Inc. 4435 Ravenswood Ave., Chicago, Ill.



SCHWEITZER & CONRAD FUSE

■

Testing Tool

A pocket clip has been added to Test-O-Lite, a tool for testing electrical circuits. A new feature is increased sensitivity so that it more easily detects the presence of voltage from 90-volts to 500-volts a.c. or d.c. by small neon lamp located in body of tester. Used in locating burnt out fuses, leaks, short or open circuits or defects in wiring. L. S. Brach Mfg. Corp., 55 Dickerson St., Newark, N. J.

BRACH TEST-O-LITE

EQUIPMENT News

[FROM PAGE 89]

Vibrating Voltage Regulator

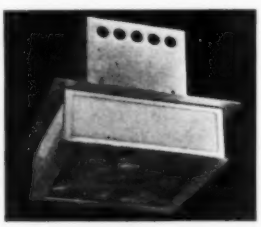
This vibrating type regulator is designed for voltage control of a.c. generators, which are subject to wide load variations. No dash pots or other damping devices to slow action, when load variations occur. All live parts are enclosed for safety. Easily installed and operated. Ideal Commutator Dresser Co., 1041 Park Avenue, Sycamore, Ill.

IDEAL VOLTAGE REGULATOR

■

Lighting Fixture

A semi-flush mounting Condi-Lite for use in specialty shops, department stores, auditoriums, art galleries or where it is desirable to provide some light on the ceiling or to recess a portion of the unit. This line of fixtures also includes flush mounting, surface mounting and lighting vertical surfaces. Condi-Lite Corporation, 43 East 20th Street, New York



CONDI-LITE FIXTURE

■

Semi-Indirect Luminaire

Sight-Craft Lu-Max is a semi-indirect luminaire with snow-white glass bowl giving a moderate downward light component. Gives maximum in lighting efficiency, with a low surface brightness. Glass bowl is made with variable density to give comparatively even lightness over entire surface. Smoot-Holman Company, Inglewood, California.

SMOOT-HOLMAN LU-MAX

■

Screw Driver

A small size pocket "Flash-Lite" screw driver with clip has been designed for use by householders, car owners, auto mechanics, radio, refrigerator and oil service men who need a tool for working in dark places. Handle, octagon shape, holds one standard battery and light bulb. The blade, two inches long and ¼-inch in diameter, is made of tempered steel. Stanley Tools, New Britain, Conn.

STANLEY SCREW DRIVER

■

Indoor Transformer

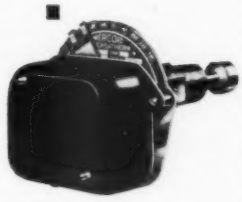
This sign transformer is adaptable to every type of indoor luminous sign. Designed with secondary (high tension) connections concealed, meeting requirements of N.E.C. and Underwriters' Laboratories. Primary connections are panel-mounted inside the compartment and no soldering is required. Removal of end caps exposes wiring compartments. Combination knockout and bushing in top of case provides for primary current entry through cord and plug, or through flexible or rigid conduit. Available in Series 728 and 726. Furnished with or without three-conductor cord and plug, with 2-prong plug and means for grounding, and primary pull switch. Jefferson Electric Company, Bellwood, Ill.

JEFFERSON INDOOR TRANSFORMER

Lantern Bracket

A new type of modern lantern bracket for exterior use. Unit No. 526 is a hexagon lantern, measuring 30 inches overall. Available in cast iron, bronze or aluminum. The Herwig Company, 1753 Sedgwick Street, Chicago, Ill.

HERWIG LANTERN BRACKET



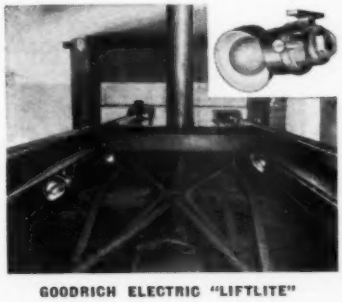
MERCOID CONTROL

Control

Combined pressure and low water control Type DA-121 with Dresser quick hook-up features, for making regular gauge glass boiler tapping installations. For pressure, control is actuated by means of a Bourdon tube. For low water protection, a copper float is used within a sturdy bowl housing. Float drops and opens control circuit. Sealed mercury contact switch cannot be affected by dust, dirt or corrosion. The Mercoid Corporation, 4201 Belmont Ave., Chicago, Ill.

Garage Lift Fixture

The "Liftlite" is designed to mount on track of automobile lifts for under chassis illumination. Reflector may be rotated upwards, sideways or downward. The 50-watt lamp and reflector can be removed as a unit, for cleaning and relamping by releasing a spring set plunger in hood. Packaged in sets of four and arranged for easy attachment to lift track. Goodrich Electric Company, 2900 N. Oakley Ave., Chicago, Ill.



GOODRICH ELECTRIC "LIFTLITE"

Advertisers' Index

* See 1937-1938 Buyers' Reference number of Electrical Contracting for additional information on these companies and their products.